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ABSTRACT

As part of a study of access and admission to higher education in Germany and the United States, a group of papers on medical admissions in various countries was commissioned. The papers presented in this book reveal wide differences in admissions policies and procedures. Barbara Burn examines some of the major issues in a foreword: representation of socioeconomic strata and minorities, foreign student enrollment, access to medical education for women, human and personal qualities in admission, alternate careers for medical applicants, and the role of government. The situations in 10 countries are described in turn by specialists: Australia (R. R. Andrews); Canada (Barbara M. Ferrier, Ronald G. McAuley, Robin S. Roberts); Denmark (Jorgen Worm-Petersen); France (Pierre Pene and B. Antoine); Federal Republic of Germany (Hans E. Renschler); Italy (Gaetano M. Fara); The Netherlands (N. H. F. W. Wijnen); Sweden (Helmer Larsson); the United Kingdom (A. D. M. Greenfield); and the United States (John Z. Bowers). (MSE)

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ADMISSION TO MEDICAL EDUCATION IN TEN COUNTRIES

Barbara B. Burn, Editor

A project of the ICED German-U.S. Study Group on Access to Higher Education, supported by a grant from the Volkswagen Foundation.

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FOREWORD

IN 1975 the International Council for Educational Development organized a comparative study of access policy and admissions practice with respect to higher education in the Federal Republic of Germany and the United States. This study, financed by a grant from the Volkswagen Foundation, was supervised by a joint German-U.S. Study Group, chaired by James A. Perkins, chairman of ICED, and directed by Barbara B. Burn, director of International Programs at the University of Massachusetts, Amherst. The final Study Group report will be issued in 1978.

During the course of the study, a number of special papers were commissioned and several conference reports were prepared. While all these documents made important contributions to the deliberations and final report, a few of them have such universal interest that it was decided to print them as part of the publication program of the access study.

John Z. Bowers, president of the Josiah Macy, Jr. Foundation and a member of the German-U.S. Study group, made a notable contribution to the work of the Study Group by helping to organize and chairing a special conference on admission to medical education in ten countries, held in Schliersee, Germany, in May 1977. At this conference distinguished experts reviewed and compared the experience of their respective countries in selecting recruits to what is probably the most competitive profession to enter worldwide. A recurring theme of the discussion was how to reconcile selection of persons of the highest ability and the need to take into account qualities needed in staffing the medical profession which do not lend themselves to objective assessment of cognitive factors. Although no easy solutions

are at hand, the Schliersee conference made clear the complexity of the problems involved and the variety of possible solutions.

While the access study was basically a German-U.S. project, the problems examined are surely universal. For this reason it is hoped that this important document will be of interest and use to all those concerned with the pressing problem of providing an orderly and just system of access to higher education, especially to the more competitive professional fields.

James A. Perkins, Chairman
International Council for
Educational Development

SOME MAJOR ISSUES

Barbara B. Burn

THE medical experts meeting in Schliersee, Germany to discuss access to medical education compared wide differences in the admissions procedures and policies among the ten countries they represented. These ranged from virtually total reliance on computerized measures of academic achievement in secondary school leaving examinations, as in Australia and Germany (combined with a waiting period for the latter), to open admission for all secondary school graduates, as in Italy, or for those applicants successfully completing certain required secondary subjects, as in France. They included the complex lottery system pioneered in the Netherlands, and a combination of secondary school record with evaluation of more personal qualifications such as motivation and problem-solving skills, especially at McMaster University in Canada, but also in the U.K. and U.S.

Notwithstanding this variety in approach, in no country is there agreement that the perfect solution has been found or that the approach of one country is exportable to others. Several of the countries represented have recently modified their medical admissions approaches—Denmark, Sweden, and Germany, for instance. Access to schools or faculties of medicine (and to a lesser extent of pharmacy, dentistry, and veterinary medicine) arouses more public concern and is more controversial than is access to other kinds of higher education, in part because it is so competitive.

Everywhere medical school attracts larger numbers of students. Admission has become increasingly competitive, whether at initial entry as in countries with restricted access, or in staying the race, as in France, Italy, and Denmark, whose access systems depend upon a high dropout after entry. Various factors

are at work: a greater societal affluence which causes more young people to aspire to the medical profession, the personal affluence and social status which the profession assures in most countries, and the very competitiveness of the admission process which prompts many of the more able young people to enter medicine as a way to affirm their exceptional ability. Still another factor may be the greater commitment of contemporary youth to serving society. In Italy one fifth of all students in higher education are in medicine, and in Germany before admissions restrictions were imposed in 1966 some 11% of university applicants put medicine as their first choice of field. In the U.S., of college graduates wishing to continue their education, 25% apply for medicine.

Admission to medicine is also of major public concern because of the high costs of medical training, the consequent pressures not to produce an oversupply of doctors, and the greater difficulty of reconciling meritocratic and egalitarian forces in a field so central to and well rewarded by society. Educating for the medical profession is probably the most expensive of any field, as high, for example, as $50,000 in Australia for the basic six-year program. In the United States, costs in 1972-73 averaged $12,000 per year in one study, while another study in the same year gave a range of $16,000 and $26,000 per student per year. With this typically high cost, most if not all of which is met from public funds in most countries, there is a strong impetus for manpower planning, as an oversupply of doctors is a luxury few countries can afford. Already there are unemployed physicians in Italy and the ratio of physicians to inhabitants in that country may be as high as 1/300 by 1980. It is now 1/440 in Germany, up from 1/750 in 1970. In Britain some members of the medical profession, especially the more junior ones, are deeply concerned that the planned increased intake to medical schools up to the early 1980s will make medical unemployment inevitable. Some European Community countries fear that the mobility of the professions mandated under the Treaty of Rome may result in an inflow of doctors from member countries having a surplus, especially Italy, thus bringing depressed employment to the profession in the countries affected by the inflow.

Medicine is one of the highest prestige professions and one of the most remunerative in nearly all countries. Egalitarian demands for equal opportunity for access to medical education and to the medical profession are hence more acute than for many other fields, and denial of access concomitantly more difficult. At the same time, because the role of the physician requires a high level of ability, this hardly seems a profession in which egalitarian pressures to allocate opportunity on a socially equitable basis should be implemented at the expense of competence in the profession. In comparison with other fields, selection for medical admission is in greater need of rational and persuasive justification, more driven to objective criteria because of their alleged fairness and clarity, more conflictive and sensitive, and more likely to be an issue for public intervention, ultimately through litigation in the courts.

Meritocratic pressures appear more readily assuaged in systems of access to medical education where selection takes place after students have begun their medical studies, e.g., through dropout, as in France and Italy, than in systems which select for initial entry and have what amount to constitutional guarantees of equal access, as in the U.S. and Germany. Whether it is the system or the individual institutions which admit students has surprisingly little effect on how meritocratic and egalitarian pressures are resolved. However, in all ten countries represented at Schliersee there was clearly a deep concern with how these pressures might best be accommodated in the context of diminishing institutional autonomy, the diverse staffing needs of the medical profession, and the admitted importance of personal qualifications for success in the profession. Because the latter are not yet fully quantifiable, they tend to be rejected or assigned a minor role in the selection process, except at McMaster in Canada.

Supplementing the ten country presentations by the experts at Schliersee were sessions on topics of common and urgent interest: the representation of different socioeconomic strata and of minorities in medical admissions, foreign student enrollments, access for women, and, basic to this, the evaluation of personal and human qualities in medical selection. As not all applicants can be admitted to medical education, alternative careers were

also considered. Because public interest is so closely connected with medical education, given its social contribution and linkage with manpower planning to staff a critical profession, the role of government in access was the major topic. The concluding if inconclusive discussion was on ways to improve access.

Representation of Different Socioeconomic Strata and Minorities

The proportion of students coming from different socioeconomic strata and of minorities admitted to medical school has traditionally been significantly less than their representation in national populations. Should the medical profession, medical schools, and governments be concerned, and if so, what options are open to them to remedy this situation and with what consequences? A high proportion of medical students tend to come from families where the father is a doctor, e.g., 21.2% in Britain in 1966 (17.19% in 1957) and over one fifth in Germany. In that country not only does a much higher proportion of the socially advantaged apply to medical school than do working class youth, but also the percentage denied immediate entry who are subsequently admitted though the waiting list is high, whereas, as Dr. Renschler (West Germany) points out, the percentage of children of manual laborers applying through the waiting list diminishes with the waiting period. In the U.S., although black student enrollments have increased, they still are underrepresented in relation to their percentage of the national population.

Is it important to a society to include all groups in a profession in the interest of social cohesion and justice even if the level of competence of some may seem less? Do the disadvantaged and minorities admitted to the profession make a special contribution to it and to the demographic groups from which they come, or do they shed the circumstances and values of their pasts and not improve medical care for their strata of origin? In this connection it was apparent in the U.S. in the mid-1960s that blacks entering the medical profession were not apt to practice medicine in the black community as they, like others, wanted to improve their socioeconomic position through their profession.

The foreign worker minorities in the European countries, *Gastarbeiter,* are so far not considered a social problem in terms

of access to higher education, much less to medical education. In Britain a large proportion of the nonwhite population is highly self-selected; Indians and Pakistanis constitute a higher percentage of entrants to medical education than they do in the immigrant population as a whole because of their motivation and strong preparation. In the continental European countries entry to medical education is not yet an issue because the children of *Gastarbeiter* are not yet of university age. However, they figure in the secondary school situation, e.g., in France where 8% of the pupils are Algerian. In Germany the foreign workers' children may prefer to keep their own citizenship, as they are more easily admitted to higher education as foreigners (though very few actually are) than as naturalized citizens competing with German citizens.

There was little consensus among the Schliersee seminarists on the appropriate policy for medical admission in relation to the disadvantaged and minorities. Still very few, but an increasing number of young people of low socioeconomic background attempt admission to medical education, having first been detoured into less elitist fields. This may partly absolve the medical conscience but fails to solve the problem of unequal representation. Countries concerned about minorities—an issue that seemed of little relevance to most of the countries represented—often lack the demographic information necessary to identify and attempt to change present inequities, thus making it difficult to monitor the present and re-direct the future. An uneasy agreement seemed to prevail that the future should be directed toward improving the representation of different socioeconomic groups and minorities in medical education, but with existing—and mostly accepted—meritocratic pressures on selection, few remedies seemed feasible.

Foreign Student Enrollments in Medical Education

Denmark excludes foreign applicants. In the Netherlands up to 4% of places in medical faculties are reserved for foreign students, in Germany up to 8%, and up to 10% in Sweden. In Britain 14% of undergraduate medical applicants are foreign, but 8% of those admitted are foreign, and as of 1978 it is intended that no more overseas students will be admitted than were enrolled

in 1975-76. In the U.S. foreign students represent only 1.2% of the total medical enrollment. Australia also has a small minority of foreign medical students, declining from 8.3% in 1968 to 6.1% in 1974 as medical education opportunities for Asians have expanded in Asian countries. In France foreign students are limited to 5% of the enrollment of French students. In Canada obstacles to higher education admission are increasing for foreign students; higher tuition is one of the important obstacles.

Why should a country reserve places in medicine for foreign students when an overproduction of doctors looms in the industrialized countries? Should those countries that can afford to train more students make their training capacity available to more of their own citizens rather than admitting foreign students? Should another country admit foreign students whose qualifications are insufficient for admission at home? Can a person trained abroad for the medical profession function effectively in his/her home country, not just in terms of the certification but also of the kind of training? If on return home they cannot practice, should they have been trained abroad? Does medical training abroad contribute to the brain drain, and if so (some 4-5,000 African doctors are practicing in France), how can they be persuaded to return to their home country? The nonequivalence of medical preparation in terms of levels and qualifications is still a serious obstacle to mobility in the profession, both in the training and in medical practice. Schliersee produced no final answers.

Several of the continental Europeans observed that it is important to differentiate among foreign students in medicine. For example, those from European Economic Community countries have a very different status than those in other countries and are accorded preference. A major point was that the training for medicine in one country may not fit the practice of medicine in another, and hence training foreign students may do them a disservice, ill-equipping them for the mode of medical practice in their home country.

It was agreed that medical schools and faculties do themselves a disservice by not admitting some foreign students; they narrow the scope and educational impact of their own system.

Assuring a certain level of quality by restricting admissions to those who meet the qualifications at home would fill the need of aspirants who are capable but for whom no space is available in the home system.

A problem related to access to medical education abroad is access to the medical profession in another country. In the U.S. foreign medical graduates (American and foreign graduates of foreign medical schools) constitute one fifth of all the physicians. In Britain 10,000 of the 60,000 doctors employed by the National Health Service are Indian. Both the U.S. and U.K. are tightening up on the practice of foreign medical graduates and foreign doctors, in part because of doubts about their professional qualifications and their communication skills, in part to reserve the profession for home-trained nationals. When conditions of work at home fail to recruit sufficient nationals to staff the profession, it may be desirable to encourage an international flow of doctors to take up the slack. Recent federal legislation in the U.S. requiring American medical schools to admit Americans who have completed at least two years of medical study abroad is a current example of this issue; it is a measure exceedingly unpalatable to U.S. medical schools which are committed to autonomy in their admissions policies.

Access to Medical Education for Women

The last decade or more has seen a significant increase in the proportion of medical students who are women. The increase has been from 36% to 46% in France 1970-76, from 16.1% to 37.1% in Australia 1960-75, from 21.4% to 30.7% (of entrants) in the Netherlands 1961-75, from 9% to 20.5% in the U.S. 1966-76, and from 26.3% to 34% (of entrants) in Britain 1969-74. The admissions reform policy being introduced in Sweden in the fall of 1977, which emphasizes access for employed persons, includes the concept of qualifying child care in the home as employment, thus widening opportunities for some women. Women now have greater access to medical training as a result of the worldwide women's movement for greater opportunities, of new legislation in some countries, and of less easily identified factors such as higher motivation. In some countries in the

1980s they may increase to 50%; Great Britain is one such example. By contrast, in the Soviet Union and the Eastern European countries, women have outnumbered men in the medical profession for some time, but not in the more prestigious positions within the profession.

Two major issues involved in female access to medical education are whether admissions criteria and procedures give and should give adequate opportunity to women, and the implications for the medical profession of an increasing participation of women. The Schliersee seminarists recognized that the admission of women has only partly to do with selection systems and much to do with the motivation of women to aspire to medical school; no medical admissions system deliberately and explicitly discriminates against women. It is interesting to note that at McMaster, where noncognitive criteria and an interview process are heavily relied on, and no particular academic background is prescribed, 47% of students admitted in the last three years were women even though they constituted only 29% of applicants. In Australia the Monash University medical faculty abandoned interviewing candidates after the interview process resulted in more women being selected than men although the male applicants interviewed were more than double the number of women.

Arguments against substantial female enrollments on the basis of a lesser performance capacity in medical school or in the profession are not supported by available evidence. In Australia it was projected that the fact that fewer women doctors work full-time than do their male counterparts will only reduce the total productivity of the profession (hours invested) by about 3.5% by 1991 in comparison to 1971. The proportionate staffing of specialties within the profession is still not determined; pediatrics, psychiatry, obstetrics, and community medicine may be relatively less attractive to men than the higher prestige specialties such as surgery, cardiology, and others.

For women to have equal access to medicine, postgraduate training must become more flexible. For example, the long hours per week required in the U.S. in residency training are adjusted to the time constraints which many women face. Women should also have equal chances to ascend the academic ladder. Few full professors in medicine today are women, so the role

models for the higher status positions in the profession mostly neglect women. However, so much change is under way and is so relatively recent, this too seems destined to change.

Human and Personal Qualities in Selection

The McMaster University faculty of health sciences gives a high priority to human and personal qualities, and is probably unique in the extent to which its admission system searches out particular attitudes and personal characteristics among applicants. However—and Dr. Ferrier (McMaster University) emphasized this point—the admission criteria applied are aimed not only at recruiting certain kinds of people for the medical profession but, more importantly, at selecting those who will perform well in its particular program of medical education. This differs substantially from more traditional programs in stressing self-directed learning, problem solving, tutorial instruction, and a community orientation. In short, the selection criteria reflect McMaster's program, and might be far less successful if applied in more conventional medical programs. Selection criteria, academic program, teaching methodology, and educational aims and output need to be closely interrelated in any educational system. Other systems tempted to apply selection criteria and procedures such as McMaster's, without altering other elements in the total system, are unlikely to achieve comparable success.

In principle, medical admissions systems aim at admitting students who will perform successfully in the profession. Because the means of measurement are controversial and not susceptible to objective norms, medical schools and faculties worldwide tend to settle for a more concrete measure of their effectiveness —graduation rates or even successful performance in the first year or two of studies. In some countries such as the U.S. and U.K. there is such a strong commitment to a high success rate that very few students fail to complete their studies, and their success rates may therefore be more an index of the dedication of teaching staff to student success than of student ability or the effectiveness of the admissions system. Thus, in the U.S. in 1975-76 the total attrition rate was, as John Bowers states, 1.53%. This amazingly high survival doubtless has only partly to do with the rigor of the admissions process.

In a sense all ten countries represented at Schliersee take personal and human qualities into account in their selection systems. As R. R. Andrew (Monash University) observed, one of the best measures of such personal qualities as persistence, motivation, and self-discipline is a superior secondary school record. The ability of French medical students to survive the two-year initial cycle in medical education—only about one third do—is surely a test of these same personal qualities as well as of ability. So too does the new Swedish system giving access to persons who did not complete the secondary school premedical program in the usual way, and need to demonstrate exceptional motivation to enter medical training after being employed and at an older age than recent secondary school graduates.

The interviewing of students is an admission procedure followed by most medical schools in Britain and the U.S. A means to assess student motivation, the interview is likely to be important mainly in borderline cases. It may be as important to the student in arriving at a final decision on whether to enter a particular medical school, if accepted, as it is to the school in deciding to offer a place to a student.

Alice J. Irby distinguishes between the "actuarial" and "clinical" approaches to decision making in admissions. The actuarial rank orders students on the basis of such objective indices as test scores, high school grades, rank in class, and so on, while the clinical approach "involves the subjective examination of the information in a student's record," including personal characteristics revealed in letters of recommendation and interviews.[1] It seems likely that U.S. medical schools are being or may be impelled more toward the clinical approach as increasing litigation on admission to such competitive fields as medicine puts pressure on institutions to apply uniform objective criteria in order to conform to the equal protection clause of the Fourteenth Amendment.

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[1] Alice J. Irby, "A Review of Admissions Policies and Practices," paper prepared for the May 1975 meeting of the German-U.S. Study Group on Access to Higher Education, Princeton, New Jersey, p. 13.

In general the Schliersee conference participants would probably agree with the summary statement on efforts to include measures of human and personal qualities in admissions procedures in the U.S. which was prepared by Britell and Schrader of the Educational Testing Service for an earlier meeting organized by the German-U.S. Study Group, even though the statement referred more to college than medical admissions:

> A great deal of research has been devoted to efforts to measure motivation, creativity, leadership, and other characteristics which would appear to relate to subsequent achievement. Some success has been achieved in research settings. However, the transition from use in research to operational use in college admissions practices has not occurred, although some admissions officers may try to assess these characteristics informally through interviews or letters of recommendation. To some extent, lack of consensus on both the nature and means of measuring these characteristics has probably hindered their acceptance. Biographical data of past performance and success play an important part in the admissions process, but efforts to systematize use and evaluation of this material by developing quantitative indexes on biographical data have as yet had little or no impact on college admissions.[2]

Alternate Careers for Medical Applicants

Large numbers of young people applying for medical admissions either fail of admission (75% in the U.K.; nearly 70% in the U.S.) or in some systems are sorted out after one or two years (66% in France; 40% in Denmark before the new restricted admissions system). What alternate careers should be or are available for these persons is therefore an important issue in the total success picture. What happens to those wanting a medical education but unsuccessful in obtaining it? Little concrete information is available to answer this question (an estimated 10% of French medical dropouts enter allied health fields) but it was

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[2] Jenne K. Britell and William B. Schrader, "College Admissions Testing in the United States," paper prepared for the May 1975 meeting of the German-U.S. Study Group on Access to Higher Education, Princeton, New Jersey.

agreed that most go into fields quite unrelated to health care rather than into a less competitive specialty within it, such as physician's assistant, nurse, laboratory technician. The seminarists agreed that it would be disastrous if the allied health fields were staffed by frustrated aspirants to the medical profession.

In most of the countries represented at Schliersee, young people go directly from secondary school to medical training. They are forced to make career choices before they have been able to "try out" a particular specialization such as medicine. Such required early decision making, young people's inadequate knowledge of career choices, of the training these involve, and of their own aptitudes, too often cause a person to choose medicine when a less rigorous allied health profession might have been more appropriate.

A related issue discussed was whether practical work in a medically related field or a year or two in a medical program should be counted as credit for or give an advantage to those either seeking medical or related training. Should students be able to transfer from one health training program to another without having to start back at the beginning of the one transferred into?

The consensus on alternate careers was that there should be more mobility between different lines in the health care field, that students should have more information on the choices possible and on their own ability to succeed in a given field, that the profession of physician's assistant should be expanded (although physicians often resist this), and that staffing the allied fields with "failed doctors" would denigrate the status of these fields and produce discontented practitioners.

The Role of Government

In all ten countries government affects access to medical education by determining the funding of most if not virtually all of capital and operating costs. Even in the U.S., the only country among the ten with private medical education, the federal government supports much of the capital costs and provides support for students. The states subsidize low tuition at state medical schools for in-state students, thus facilitating access for

them. In nearly all the countries, decisions are made centrally by government or intermediary bodies on the numbers of students to be trained in medicine even though estimates of national needs for the medical profession often prove unreliable.

Governments also directly affect access in decisions such as those to give foreign students a certain percentage of places, as in Germany and Sweden, or even to exclude them, as in Denmark. In the U.S. federal legislation to require U.S. medical schools to admit U.S. medical students who have completed part of their training abroad or forfeit federal capitation grants is also a distinct intervention in admissions. Legislation to phase out foreign interns and residents by 1980, aimed at increasing the number of graduates produced by U.S. medical schools, is another significant if indirect intervention on the part of government, as is the federal funding of medical students who agree to practice in areas having a shortage of doctors. This is to meet the needs of some 35 million rural Americans living in areas lacking enough physicians and other health professionals.

It is only in the last few years that government authorities have begun to determine criteria and procedures for admission to medical (and other higher) education, and mainly within the continental European countries: in the Netherlands with the nationally mandated lottery system; in Germany with the Higher Education Framing Law of 1975 and the implementing legislation the *Länder* are consequently obliged to adopt; in Denmark with its 1976 legislation to restrict admission to all higher education and definition by the Ministry of Education of admission requirements; in Sweden as a result of a 1975 parliamentary decision to broaden higher education and of new admission rules for medical training not yet defined at the time of the Schliersee meeting; and in France as a result of restrictions imposed by the Ministry of Education in 1972. The role of the government in determining admission criteria and procedures may soon become much more critical in the U.S. depending upon the decision of the Supreme Court in the Bakke case on the issue of preferential admissions for minorities.

Government is thus everywhere closely involved in access to medical education. This is necessary and inevitable because of

the public funding of medical education and the concern of government to ensure a sufficient supply of doctors. In the view of most of the seminar participants, government should not be involved in qualitative matters or with curriculum, nor should government be closely involved with the management of medical schools and faculties. If it were, recruiting the high quality people essential to running medical education would become much more difficult. The balance of public concern, institutional autonomy, and involvement in the medical profession made possible in the U.K. through the interrelated roles of the General Medical Council which recommends to the Secretary of State for Health on numbers of doctors needed in the National Health Service, the University Grants Committee which funds recurrent and capital costs of medical education, and the DHHS which supports the operational costs of the teaching hospitals, was cited as model in combining government involvement with peer review and ensuring that the medical profession retains a dominant role in questions of quality, curriculum, and admission.

A glut of doctors is anticipated in some European countries. The number of doctors in France, for example, seems likely to double in the next fifteen years. But a satisfactory standard of health care remains elusive. Should it be defined in terms of the physician/population ratio, or how long one sits in a doctor's waiting room, or the distribution nationally and regionally of doctors? In Sweden the doctor/population ratio will decline from 1/775 in the 1970s to 1/335 in 1990. Adequate staffing of the medical profession tends to be redefined as a consequence of the complex and multiplying demands of the industrialized nations for health care generated in part by affluence. However, the amount of health care a society can afford has its limits. Can and should the U.S. increase its present level of 8.9% of the GNP for health care? Is health care appreciably better in the U.S. than in Denmark where only 4% of the GNP goes to it? To determine the goals of access requires determining the goals for output, and so far there is little consensus on this.

Underlying the Schliersee discussions on access, but debated relatively little by the participants, was the question of what

kinds of people the medical profession needs. Generally, it was taken for granted that it should recruit youth with the highest ability. Important exceptions to or modifications of this principle, apart from McMaster's unusual admission system, include the recognition given to employment experience in Sweden and Denmark, the admission of "mature" students in Britain, and the special consideration given to hardship cases—and the controversial waiting period—in Germany. The special criteria which individual medical schools in the U.S. adopt in order to recruit certain kinds of persons are another major exception. One example is the emphasis given by Michigan State University to admitting students likely to practice in areas inadequately served by physicians and hence its according special consideration to applicants from such areas.

Although the implications for medicine and for other professions of creaming off the most able young people to medicine were not discussed in detail at Schliersee, the apparent trend in some countries to take other factors into account in addition to secondary school achievement may reflect an increasing awareness of the need for the medical profession to recruit a spectrum of talent rather than primarily the highest achievers in secondary school or premedical programs in higher education. Moreover, as one participant aptly observed, access is only one factor in determining the kinds of doctors produced by medical schools and faculties. In the final analysis the quality of the medical profession depends not on admissions policies but on the quality of the education offered.

AUSTRALIA

R. R. Andrews

ADMISSIONS policies in Australia have, as in most countries, evolved slowly with a few identifiable quantum jumps. At the start of the Second World War (1939) there were no quotas in any of the four then existing medical schools. A pass in the state matriculation examination, now generally called the higher school certificate (H.S.C.), taken as a rule at age 18 at secondary school, and an affluent parent prepared to support the student over a six-year course, were all that was required. The socio-economic group enrolled predictably was from the professional classes, mostly from the private schools, and about a fifth the sons of doctors. In an increasingly egalitarian society it is remarkable how this pattern persists both here and in the United Kingdom.

The standard of teaching has always been good and graduates have been generally acknowledged as being on a par with those from the U.K. where a large number went, and still do, for post-graduate vocational training. Melbourne University medical school, the first to be established in Australia (1862), required a 5-year course 40 years before this was standard in the U.K., and a 6-year course introduced in 1922 was followed by the other two medical schools then existing.

Medicine became a highly desirable and privileged profession—perhaps overprivileged. For the bright boy from the middle classes there were many fewer counter attractions than in other countries of comparable affluence. The armed services were rudimentary without a professional Australian Army or Navy, and Australia was dependent on Great Britain. The Civil Service attracted those from a lower social stratum who could not afford

tertiary fees, and became to some extent unattractive for its reputation of time-servers. The churches depended for the few leaders and intellectuals on those recruited from the U.K., and were never held in the same regard in Australia. School teaching was left to pedagogues not far removed from Dr. Arnold and Rugby, nor far from the Dickensian prototype. Politics were left to the argumentative faction of Irish extraction, a few landed gentry, and a small number of dedicated men, many with a legal background. And, of course, there was no foreign service, and therefore no diplomats, remarkably enough, until this country established its own foreign policy and foreign service after the Second World War.

Medicine, therefore, with the demands for a broad science and humanities base, polite manners, and its strong influence in the corridors of power, even if exercised only indirectly, attracted many of the brightest of any cohorts.

After peace in 1945 much changed. There was a growing demand for tertiary education and medicine proved increasingly popular. The effect was the introduction of quotas in the two oldest schools (Melbourne and Sydney) of the five existing at that time. These were based entirely on aggregate matriculation scores, the school terminal examination common to all candidates in that state, and the aggregate marks achieved in four or five subjects, which provided a rank order for selection.

The main thrust occurred from 1960 onward after an acceptance by the federal government of a policy of rapid expansion of existing universities, the establishment of new tertiary institutions, and the provision of large federal grants to the states for capital works and maintenance. As a result the university population (quite apart from similar growth of colleges of advanced education, teacher training colleges and other tertiary institutions) grew in a spectacular way.

In 1960 there were 53,300 undergraduates in five universities; by 1975, 132,800 in 18 universities. The number of graduate students from these years grew from 3,200 to 16,000. Medicine reflected these changes. In 1960 there were 4,823 undergraduates in the five medical schools; by 1975, with nine medical schools, there were 8,000 undergraduates. By 1991 there will be

approximately 10,500 with 1,620 graduates expected in that year from eleven medical schools, including two new ones to be established in the next few years. With this vast expansion there have been increasing demands for admission to the medical schools. The abolition of all fees in universities in 1974 has added to the pressures.

The structure of education in Australia presents crucial constraints to any revolutionary change in the selection process for medical school. Education from primary to secondary level is compulsory and is the responsibility of the six states where, with minor variations, the primary phase is for six years and the secondary six years. Successful applicants enter medical school in their 18th year. There are no fees and no private tertiary educational institutions. All universities are autonomous but almost entirely dependent on funding from the federal Treasury on the advice of the Universities Commission established 17 years ago, which has increasingly difficult battles for money; its recommendations are no longer accepted *in toto* without challenges by the government.

In effect the input is dependent on University Commission policy established by the Karmel Report[1] which has now, through its financial power, set targets. A university could depart from this and increase its quota for any faculty but only at the expense of others, a total sum being made available each year to each university. The average cost per annum for the six years is $5,000 to which is added indirect costs in hospitals—most are calculated and paid for. The six-year medical course costed in 1975 was $41,000 (Andrew 1977)[2] and with inflation no doubt nearer $50,000. Universities set their own admission standards and numbers of admissions and faculties in turn their own. Quotas are now common to most faculties of most universities and have been in operation in all medical schools for about 15 years.

The curriculum, including the length of the course, is decided by the faculty, but is still quite anachronistically subject to regular review and even veto by the General Medical Council sitting in London. This enlightened body, a branch of the Privy Council, and a reluctant academic father figure, lays down broad

guidelines, but sends out a small group to study academic planning of all new medical schools to decide whether to recommend accreditation or not. For some years this whole question has been under review, and an Australian analogue proposed, but the intransigence of some states, particularly Victoria, has thwarted a rational, national plan.

For a variety of historical reasons, especially for the first 150 years of their almost entirely British derivation, medical schools have shown small variations in their curriculums, standards, and teaching patterns. As a result there is a remarkable national homogeneity among graduates; once graduated in their own state they can be registered in any other and are, in the main, unrecognizable in their origins, apart from whether they support rugby or Australian Rules Football.

This is the background which has persuaded nine of the ten presently existing medical schools to impose quotas. It is not possible to be precise about the national figures of those seeking admission since there is no equivalent of the American Association of Medical Colleges and the American Medical Association, which provide national statistics in the United States. Any estimate may be misleading since the preferences, 1st and 2nd or more, are difficult to analyze, and there are many hundreds who apply for admission *ad eundem statum* to different years, who apply from other courses, who are mature age students, or disadvantaged students, and others, including many foreign students. Based on accurate data available for Victoria, where its two medical schools admit 380 (a third of the qualified applicants), it appears that the pressures on medical courses are of the same order as in the United Kingdom and United States.

Table I gives some indices where comparisons can be made between Australia, Britain and the U.S. of medical graduates and the number of schools involved.

The present policies for admissions to all existing medical schools are summarized in Table II.

It is clear that all the emphasis is on selection by using the appropriate state terminating examination from secondary schooling. There are a number of variants from state to state but in no

school is the personal interview a feature, nor are school or extramural reports factors in selection. Queensland alone has recently embarked on a different system using teaching assessment (TE) to provide rank order for the state, with various other determinations to scale those judged to be from handicapped school situations, e.g., rural schools with perforce inadequate spread of subjects and maybe poor laboratory-library facilities.

TABLE I
Comparison Graduate Outputs:
Australia, Britain, U.S.

	Year	Population (millions)	Medical Graduates	Med. Schools (graduating)
Australia	1974	13	1,115	8
		(1)	(1)	(1)
Britain	1973/74	55	2,645	29
		(4)	(2.4)	(3.6)
U.S.	1973/74	210	11,613	104
		(16)	(10.4)	(13)

The figures in parentheses are indices based on (1) for Australia

This policy has not gone unchallenged, particularly by secondary school teacher organizations and trade unions and by students. A reappraisal has been urged by many within the medical profession who are dismayed by the large number whom they as individuals identify as "strongly motivated," "highly dedicated," "certain to make good doctors," and so on. A specific proposal (Campbell *et al.* 1974)[3] argues strongly for screening by interviewing committees combined with academic achievement, i.e., to reduce this latter factor from its present 100% contribution to 60% (30% from interview and headmasters' reports and 10% from "social interests and motivation"). There are a number of difficulties related to these proposals which all in this area will recognize.

The Australian system provides for a terminal secondary schooling result which in nearly all states is not available to faculties of medicine until mid-January (the academic year extends from early March to October/November). Selection must be

completed at the latest by the end of February so that those not selected for medicine can achieve a place in the next faculty of their preference, again subject to that selection process. This period corresponds with the summer break. The mind boggles at the logistic problem of convening Selection Committees which should include senior and junior academics, a cadre of psychiatrists/psychologists, senior students (who are at present a feature of some faculty selection committees), and all imbued with the same motives and aptitudes in selection for fair and even criteria to be applied. In Melbourne, for example, about 1,000 applicants direct from school and 300-400 from the other categories would need to be interviewed, and if desired (if indeed achievable), headmasters' reports made available.

Much research in this country and in individual faculties of medicine has been done in correlations between matriculation scores by which, from the computer, presently applicants are selected. At Monash, high correlations have been shown to exist between the school chemistry and biology marks and the preclinical subjects; for the final year results in these preclinical subjects there is a fair correlation with anatomy, good with biochemistry and high with physiology (including pharmacology).

It is not claimed that the correlation results prove any more than progress at a successful rate through the course. In fact, at Monash, over the last four years, an average of 61.25% completed the six-year course in minimum time, a result not achieved in any other of the six faculties of the university where the various courses range from three to five years.

It is claimed, and can be confirmed, as stated in the influential Karmel Report (1973)[4] that "there has been a good deal of research in Australia on the effectiveness of the present selection methods. This has shown that, for university courses in general, selection on the basis of school leaving results, while by no means a perfect prediction of success in university, is nevertheless the best prediction available and there is as yet no evidence that there are simple ways of improving it. The failure rate in medicine is very low and most attrition is due to nonacademic factors. If the efficiency of a selector is measured by success at the university, the present methods of selecting medical students

Table II
Summary of Admission Policies of Australian Medical Schools

University	Quotas			Prerequisites
	1st Year	2nd Year *ad eundum statem*	Overseas	
Sydney	250 (1976)	Nil	6 Southeast Asians; others in competition	Nil
New South Wales	240 (1976)	Nil	No quota; admitted in competition	Nil
Melbourne	220 (1975)	About 30	A few (up to 10) sponsored only (1978)	English, Chemistry & 1 of Physics, Biology or Mathematics
Monash	160 200 (1979)	About 10	Up to 8 sponsored	English, Chemistry & 2 of Physics, Biology, Mathematics & a 4th subject other than Mathematics
Adelaide	120 (1974)	Small number	A few	Nil
Flinders	60	About 4	About 6	Nil
Queensland	245	Not more than 15		
Western Australia	115 (1976)		6 Southeast Asians in 1st year	1st yr: nil. 2nd yr: Biology, Chemistry and Human Biology & a 4th subject
Tasmania	48	A few	Up to 4 sponsored from overseas	Chemistry, Biology, Physics & Mathematics
Newcastle	60 (1977) Approx. 100 (1982)		Not yet decided	Not yet decided

Source: Adapted from Andrew, *Admission Policies to Australian Medical Schools* (see concluding bibliography).

must be decided to be successful. However the committee recognizes that there are many factors other than sheer academic success which contribute to a person's being a good doctor. On the other hand, the committee would not accept the view, which was put to it on a number of occasions, that 'clever' young men and women are not the best to be selected for a medical course.

Selection	Remarks
Aggregate best 5 subjects Matriculation Examination	Quota fixed by Senate, 5-year course from 1974. 300 2nd year 1977; 330 2nd year 1978
Aggregate best 10 units from approved subjects including at least 2 units of English in Matriculation Examination	5-year course from 1974
Aggregate best 4 subjects at Higher School Certificate including prerequisites; 10% bonus extra subjects; 10% debit on aggregate for repeated year	
Aggregate best 4 subjects at Higher School Certificate including prerequisites; 10% bonus extra subjects; 10% debit on aggregate for repeated year	*Ad eundum statem* admission also to 3rd year 5-10 (B.Sc. graduates)
Aggregate best 5 subjects at Matriculation Examination	
Aggregate best 5 subjects at 1st attempt at Matriculation Examination or complete academic record if previously enrolled in any University-level course	
Order of merit list based on a formula called the TE Score	TE is the aggregate best 5 subjects by teacher assessment
1st year: best 5 subjects in Matriculation. All who pass 1st year guaranteed entry to 2nd year	6 extra *ad eundem statem* to second year
Aggregate marks in the 4 prerequisite subjects at Higher School Certificate	
Not yet decided	1st year of course started 1977. No decision yet on numbers or policies

The medical profession involves complex knowledge and an analytical ability of a high order and it is difficult to see how high quality medical services can be provided without making use of intellectually able people."

This quote at length is generally accepted as valid by most deans and faculties charged with the responsibility for stating a policy and implementing it in a society increasingly egalitarian.

It can be seen that neither nepotism nor favoritism can operate, and all universities under their charters and acts of foundation forbid discrimination on the grounds of sex, race, or religion.

It can be claimed on objective tests that the system does produce graduates of a high standard. One index of this claim in the Australian system can be seen in the results of the examination of the Educational Council for Foreign Medical Graduates (E.C.F.M.G.). About 80% of all students in their final year (6th year) take this examination, most as a dry run for their finals, which have a large component of multiple choice questions in most schools, very much along the lines of the E.C.F.M.G. In 1972—the last year for which world figures are available—97% of Australian candidates passed the examination compared with a global average of 40%. The 1974 results show that globally 38.7% of all candidates passed while the Monash score (81% competed) was 99.2% passing, including one candidate who gained the highest mark recorded in any country (735).

While it is clear that the present method is fair, objective, has good correlation with final results, and provides strong graduates, it must of course ignore entirely the qualities of character, dedication, motivation, psychological stability, physical health, and so on. The difficulty lies in measuring these factors and then providing for the inclusion of these or more qualities which in the value judgment of a committee increase predictive value and fairness of the selection process. How and when is the evaluation to be made?

A ballot for selection has been seriously proposed and strenuously advanced by the Australian Medical Students Association but has gained no support from universities generally or academic staff. The proposal clearly comes from those already successfully in the system.

Many have been impressed by some of the principles in operation in China derived from individual or collective visits (both ways) and from the literature. It would be hard to imagine socio-economic frameworks more different than those of China and Australia. But it can be argued that medicine—health care generally—has an indivisible common basis and requires for its successful practice not only highly intelligent young men and women

but also those *who demonstrate their motivation by their actions and life styles.* In other words, while a committee at a moment in time interviewing the 17-18 year olds for motivation is likely to flounder or liable to pick those in their own image, the involvement in a sustained and successful way over several years in a health situation (nursing, barefoot doctor, etc.), as is a prerequisite in China, has much to commend it.

An experience in this faculty is illuminating. Until three years ago the faculty selection committee each year interviewed about 30 to 40 students clustered around the cut-off mark (about 75 percent average for four subjects). They were interviewed over two full days by a committee comprising the dean, four professors, three nonprofessorial academics (one a woman) and two senior undergraduate students (one a woman). They worked conscientiously and as objectively as they could. In the event the final score read as follows: Total interviewed 37: men 24, women 13; Selected: men 9, women 13. The committee was dissolved by faculty on the dean's advice.

There is a move now in most schools to try to have the best of both worlds, i.e., to select one component, the largest, direct from school on their academic performance without further qualification, but to reserve a proportion for selection into the second or third year of the course from among those who have successfully completed a course in the biological sciences, other health sciences such as physio- or occupational therapy, pharmacy, nursing, dentistry, veterinary science, clinical psychology.

For many years Monash has "topped-up" its 2nd and 3rd years to equal the original quota (160 into 1st year) from the faculty of science. This has provided entrants several years older, highly successful in the biological sciences, who have a minimal attrition rate. Half gain an honors degree compared with a fifth of those selected by the normal way. This has resulted in a total attrition rate of 9.7% compared with the Australian average of 15% over the six-year course. As well, 107 extra medical graduates have resulted (1966-1973). If such a system had been applied in all Australian medical schools, they would have provided 130 additional graduates each in the past decade. It is suggested that this goes only some of the desirable way of a

more flexible system. To allow for admissions as suggested above from a whole spectrum of health professions and courses at 2nd and 3rd year could achieve a desirable inclusion of those who have demonstrated their motivation and are more mature when they enter the course.

SPECIAL CONSIDERATIONS

1. *Women.* No university discriminates against women. All have recently experienced a rising tide of female entrants (1960, 16.1%; 1975, 37.1%) similar to that taking place in the U.K. and U.S. By 1991, 22% of all doctors in Australia will be females (Karmel) (at present 15%). Ione Fett,[5] whose work has been extensively and approvingly quoted in the Karmel Report has shown that in the Australian scene, women engage in 64.6% of the hours men work and that as the productivity of men falls after 45-50, that of women is rising. On the basis of her research the Karmel Report concludes that with the likelihood of 22% of all doctors being female by 1991, the effect on the whole work force would be only "about 3½ per cent lower."

2. *Foreign medical students.* Selection of foreign medical students is summarized in Table III. While in the mid-1960s about 10% of all medical students were foreigners, nearly all from Southeast Asia, changes in policy have resulted in declining numbers, and considerably fewer than 5% of all enrollments are now foreign students, nearly all of whom return to their countries of origin. Policies have changed for a number of reasons. A generous impulse toward developing countries in the 1950s to 1960s resulted in fairly high quotas for Southeast Asia. But new medical schools were developing (Kuala Lumpur), others expanding, and the relevance of the sort of medical education they acquired here to their own country was increasingly questioned by their own governments, the Australian government and medical faculties. Chauvinistic pressures were also at work although never very influential. Nearly all have acknowledged the great gain to this country, largely an Anglo-Saxon island isolated in a great Asian sea, from the flow of European migrants generally, and the large number of Asian students in all faculties. The decline in enrollments can be seen in Table III.

TABLE III
Total and Foreign Medical Students
Enrollments in Australian Medical Schools

	Total Enrollments	Foreign Medical Students	%
1968	6,254	521	8.3
1971	7,028	553	7.9
1974	7,972	483	6.1

Emphasis is increasingly now on postgraduate (vocational) and graduate opportunities for Asians. In the main only those sponsored by their governments are likely to receive offers at the undergraduate level.

Present policies then are acknowledged imperfect, but the question is whether for any country there is a generally acknowledged fair, equitable, desirable, monolithic system. Flexibility is being sought and more mature students are likely to be recommended as a proportion of an intake principally chosen on school academic performance, who had demonstrated success in one of the health-biological science areas. The rapid expansion of universities and medical schools in the last 15 years has led to very close examination of admissions policies, and it is, of course, tempting to be overrighteous and overreacting about one's own chosen policy or to be unduly cynical about ever achieving a better system. Present intakes will raise the doctor/population ratio from its present 1::718 to 1::500 by 1991 (Andrew)[6] which will be appropriate, and therefore require no change in policy to provide additional numbers.

Predictions are always difficult, especially in dealing with universities which jealously guard their autonomy, and are increasingly illusory with such tight federal government fiscal control. I can express only an individual view—an individual hope that ultimately those who wish to enter medicine will be required to follow through a university course of two or three years of basic biological and psycho-social sciences and at that point apply for admission to a 2- or 3-year clinical-paraclinical medical course, or stream off into the biological or psycho-social area. This would still result in a highly competitive situation, as in all other

countries, no matter how the course is constructed, but would delay the choice until the applicant was 20 or 21. It allows a better chance of proving his or her suitability for a rigorous university course and of judging motivation to medicine.

So long as the primary and secondary education system remains in its present form there can be few options available to medical schools in their selection processes. The opportunity for establishing junior colleges somewhat on the U.S. model was lost 15 years ago and is not likely to be revived. Allowing for a deferred decision to apply for medicine would have provided an adequate time in which more sophisticated selection techniques could be used. The question remains, however, do these more elaborate and costly methods result in the selection of more "appropriate" candidates, more "fairly" selected and ultimately "better doctors"?

Policies change in curriculum and assessment, as well as in admissions policies, often in response to alleged improvement in other countries, predominantly the U.S. and U.K. One suspects change is often made for the sake of change, or worse still, is a fashionable response quite irrelevant to the local situation. As Santayana has said of some of the reformers, "He redoubles his effort after he has forgotten his aim." In an era of exponential growth in the scientific aspect of medical practice, especially in the area of pharmacology and therapeutics, there is increasing danger of overtreatment, wrong treatment, and iatrogenic disease. The bases of diagnosis, too, have been transformed in the last 25 years to a more scientific model. While there is obviously a need for greater training for and understanding of psychosocial and community aspects of health and disease, this must not be achieved by debasing the medical course to provide only graduates responsive to the community's costly and never-ending *cri de coeur*, without knowing enough about the scientific bases of their profession. As the author has said elsewhere,[7] "In my lifetime it has become obvious that for the first time in the history of doctoring, the charming fool is much more dangerous than the scientific lout."

We need, therefore, resolution to maintain the true basis of our profession, founded on measurement on which is built the

art of practice; we must provide flexibility and be responsive to the local scene; above all we need a measure of humility in expressing attitudes which tend to represent hardened dogma when implemented.

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CANADA

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McMASTER University, Hamilton, Ontario (Canada) admitted its first medical students in 1969. These students entered a program which had objectives, structure, and learning methods[1,2] that differ in various ways from those of traditional medical schools.

The objectives of this new program emphasize the need to educate physicians who will respond to current and future health care needs of the community. The aims are that the graduates of McMaster's M.D. program will have acquired or developed the knowledge, abilities, and attitudes necessary to qualify for further education in any medical career. The general goals have been stated as follows:

1. To identify and define health problems, and search for information to resolve or manage these problems.
2. Given a health problem, to examine the underlying physical or behavioral mechanisms. A spectrum of phenomena might be included, from molecular events to those involving the patient's family and community.
3. To recognize, maintain, and develop personal characteristics and attitudes required for professional life. These include:
   a. Awareness of personal assets, potential limitations, and emotional reactions.
   b. Responsibility and dependability.
   c. Ability to relate to, and show concern for, other individuals.
4. To develop the clinical skills and methods required to define and manage the health problems of patients—including their physical, emotional, and social aspects.
5. To become a self-directed learner, recognizing personal educational needs, selecting appropriate learning resources, and evaluating progress.

6. To be able to assess critically professional activity related to patient care, health care delivery, and medical research.
7. To be able to function as a productive member of a small group, which is engaged in learning, research, or health care.
8. To be aware of, and be able to work in, a variety of health care settings.

The educational format developed for the program is based on a tutorial system in which students work through biomedical problems presented to them in small groups.[1,2] The program is intensive and continuous for three years, with a one-month summer break each year.

SELECTION OBJECTIVES

Many people involved in medical education have expressed dissatisfaction with the usual methods of selecting medical students. The emphasis on academic performance as reflected by university transcripts is felt to measure only a narrow range of all the qualities desirable in medical students and physicians. In contrast to the methods currently in use, McMaster medical program planners initiated a selection method utilizing criteria which reflected the objectives and the teaching methods of the program. The selection process which has evolved is complex. It has been described previously[3] but has undergone several important changes since that time.

The broad considerations for selection are academic competence, personal qualities, and learning styles. The academic competence of applicants has always been a consideration, but competence in other areas has also been viewed as important. The question of which personal qualities are most necessary for the effective practice of medicine is a contentious one. Obviously, the nature of the practice may exert special demands. However, there are some desirable qualities which few would dispute. Examples of these might be honesty, stamina (emotional, as well as physical), adaptability, and sensitivity. A further cluster of qualities more specific to the McMaster system of learning also exists, such as abilities in self-directed learning, self-assessment, and problem-solving.

The purpose of the selection process is, then, to identify those applicants who can meet the objectives of the M.D. program, and who can do this most effectively within the educational environment established for this program.

SPECIAL FEATURES

1. Heterogeneity

It has been accepted that a class made up of students who have very different educational, social and experiential backgrounds would be a richer one than a homogeneous class, both in terms of its ability to meet the school's objectives in relation to community health care needs, and in the contribution that class members could make to each other's education. To achieve this enriching variety, two selection principles have evolved. First, it has been agreed that no particular academic background is necessarily a preferred one for a medical education. Applications are, therefore, accepted from students from any university program, and there are no specific course prerequisites. Second, the people involved in the assessment of applicants have been chosen from a very wide variety of backgrounds representing the teaching faculty, the medical students, the physicians of the community, and the community at large.

The principal method by which members of the community at large are identified is by approaching community organizations. For example, agencies which do not represent any particular religious, ethnic, or political groups, such as the Canadian National Institute for the Blind and the YMCA, are asked to send one or two delegates. These agencies have responded very positively, and the experience appears to be stimulating and rewarding for the participants.

The Hamilton Academy of Medicine, which has two representatives on the Admissions Committee, is principally responsible for identifying community physicians.

2. Academic Requirements

In order to provide an indication of academic competence, applicants must be in at least the third year of any degree program at a recognized university, and must have achieved at least

a B average in their completed undergraduate work. For the first time, in 1976-77 a small number of places were made available to applicants who did not meet the requirements of having had a university education. These will be referred to subsequently as "special applicants."

THE SELECTION PROCESS

Rather than referring to the methods used in general terms, the process will be described as it occurred this past year. This reflects the experience gained over the preceding seven years.

1. Submitted Material

All applicants were required to submit their application form, fee, university transcript and records, three completed reference forms, an autobiographic sketch in which they were instructed to list in chronological order all places of residence since age 14 and a brief description of activities (e.g., occupations, details of school, university, and extracurricular activities) since age 18, and a letter of not more than 800 words. The candidates were instructed to answer in this letter the questions: 1. What have you done? Why? What have you got out of it? 2. Who are you? 3. Where are you going? Why? How are you to get there?

2. Academic Score

After the completed applications were received, an academic score for each applicant was assigned. This was calculated first as the overall grade-point average of all of the completed undergraduate years' work, and secondly as the average of the undergraduate years, with the most recent year being given a weighting of three, the next year a weighting of two and each earlier year a weighting of one. This weighted average favored the student who had shown an improving trend.* The better of the two averages was used to confirm that the applicant was eligible (academic score $>$ 2.5 on the 4 point scale). Graduate work was used if available in assessment of eligibility. The better of the two averages of undergraduate work was later used as the candidate's academic score.

*Studies of McMaster undergraduates' results over a five-year period showed that only a small proportion were either not consistent from year to year or did not improve.

Of the 2,190 applications received, 1,885 were complete and considered to be academically eligible. Of this number, the majority had, of course, applied to other medical schools. However, 580 or 31% of the total had applied only to McMaster. Many of these presumably would not have been eligible to apply to other medical schools because of their more stringent prerequisites.

3. Information for Applicants

All of the eligible applicants were sent a letter containing a detailed description of the selection process, and a letter from current medical students in which they stressed the need to understand what the McMaster program involves and highlighted some of the differences in the learning methods compared to those of more conventional programs.

4. Letter Score

For each applicant, in addition to the academic score already referred to, a personal qualities score was assigned based upon the autobiographic letter. The personal qualities score was determined by three independent readers. Fifty teams, consisting of one representative from the faculty, the medical students, and the community, were each given the autobiographic letter and the sketch for 40 applicants. Each member of the team assigned a score on a 1-4 scale to the letter, and the personal qualities score was taken as the sum of the three independent scores. The readers assessed the applicants from what they said about themselves in their letters in the light of their age, experiences and opportunities as highlighted in the sketch. The letter assessment form identified 14 qualities to be assessed as either present or absent by the reader. These items were then used as the basis for a final score although no formal weighting structure was imposed upon the reader in making this judgment. Readers were encouraged to provide additional comments to support the final mark in a space provided on the form.

In earlier years this part of the selection process created considerable concern. It was thought that it was too easy to be coached in what to say, or to overrepresent one's accomplishments. Some simple checks have reassured many of the critics. In recent years each team has received a group of "control"

letters. These were letters of genuine applicants that had been preassessed. It was found that the scoring of these letters was consistent among teams. In order to be able to check the truthfulness of what was said in the letter, the applicant was asked to append the names and addresses of people who could be asked to corroborate the applicant's involvement in the activities described. Last year we selected 60 letters at random and wrote to all of the named referees. A very high degree of corroboration was found and many referees said that the applicant had underrepresented his/her role. The validity of using a personal qualities score based on letter reading for selection will be referred to again subsequently.

5. Selection for Interviews

The academic score and personal qualities score were combined for each applicant, using a formula which gave approximately equal weight to each. Those 375 applicants with the highest composite scores were invited to interview. Twenty-five applicants who had very high academic scores and 25 who had very high personal qualities (letter) scores, but whose composite scores were not high enough to have been selected, were added to those to be interviewed.

In previous years, the method of selection for interview had been based on two streams, high academic scores or high personal qualities (letter) scores. The move to a composite score made more explicit the belief that a range of favorable qualities, both academic and personal, is needed in all applicants. In examination of the class admitted in 1975 it was shown that the change in method of selection for interview would have made only a small difference to the class composition.

An additional group of 25 applicants was invited to interview on the basis of outstanding references. We have not found that references can be used reliably to assess most applicants. However, some do contain descriptive comments which allow those applicants to be distinguished from the majority. This use of references as an additional selection method acknowledges that excellent candidates may not otherwise have been identified.

6. Geographic Weighting

At the stage of selection for interview, a weighting based on published geographic preferences was applied. Residents of Hamilton Health Region and of Northwestern Ontario were the most favored and decreasing priority was given to other regions, with foreign applicants last. Increasing composite score levels were required for applicants as their regional priority decreased.

7. Interviews

The interviews were held four days, on two successive weekends. All applicants selected for interview were required to come to Hamilton on one of those days. In an effort to help applicants feel as much at ease as possible under the circumstances, medical student volunteers chatted with the applicants and answered questions as they waited for their interviews.

A. Individual Interview

The first stage of interviewing involved the assessment of the applicant by a 4-person team. These teams generally consisted of a faculty member, a medical student, a lay member of the community, and a community physician. Each team had met during the week preceding the interviewing weekends and was trained by being observed while interviewing two simulated applicants (medical student volunteers) and having their performances assessed. The interview method required that three members of the team interview the applicant while the fourth member of the team observed through a one-way window. This observer function rotated among the team members.

The teams were asked to assess the following characteristics: problem solving, self-appraisal ability, ability to relate, motivation, suitability for medical career, and suitability for the McMaster program. The only information available to the team about the applicant was the autobiographic sketch which was distributed just before the interview. At the end of the 45 minute interview all four members of the team scored the assessment forms independently. They then discussed their ratings, and could, as a result of this discussion, change their scores, although there was no obligation to achieve a consensus. The team

member who had acted as observer was often able to add a different perspective to the discussion. Observers, not being obliged to ask questions, and not being caught up in the interview process, frequently found themselves able to clarify and expand on the interpretation of the other interviewers.

If the members of the team felt that the interview did not yield sufficient information for them to assign a score, they were permitted to request that the applicant be reinterviewed. Such requests were made infrequently and even less frequently granted. In discussion, it usually became apparent that the team members were responding to a difference of opinion among themselves and not to a real need for a second interview. On the few occasions when a reinterview was granted, the second team was told that it was a second interview, but was not told the reason for its occurrence.

The question of whether the assessment of a letter and the use of academic grades are valid methods of selection for interview was looked at last year when 25 applicants were selected at random from those with significantly lower interview scores. These scores might have been expected, for over the years we have been able to show modest, yet consistent, positive correlations between the personal qualities assessment based on the letter and as judged at interview. On the other hand, academic score has not correlated with interview performance but is perceived as an important quality in its own right. These consistent correlations can be achieved only if both the letter and the interview are measuring real qualities as opposed to generating random numbers, and we believe that these scores reflect underlying characteristics which might reasonably be labelled "personal qualities."

b. Simulated Tutorial

The second part of the interview process, a group exercise called a simulated tutorial, has been introduced to assess two qualities which are particularly important in the McMaster M.D. program—the ability to function well and learn effectively in a group, and the ability to learn by the method called problem-solving.[4]

To take part in this exercise, the applicants were randomly assigned to five member groups. In these groups they were met by a medical student who spent some time with them, to help them learn a little about each other. The group then entered an observation room and were given two prepared written problem situations by the medical student. The group members were allowed to select the problem they preferred, and they were then instructed to start discussing it.

The problems were constructed around situations in which many complex issues were involved. The analysis and handling of the situations did not depend on any particular academic knowledge, but were designed to test the general ability of the applicants to unravel the mesh of interrelated issues and to identify manageable topics which would have to be pursued for an adequate resolution to be achieved. After 15 minutes of discussion, the medical student, who had not taken part after the start, asked each participant to assess how the group had progressed. They were then asked whether they wanted to pursue the same problem or discuss the second one. The latter choice was the usual one. After a further 15 minutes the medical student again asked the group members to evaluate the group's progress and their own participation.

The assessors (a medical student, a faculty member, and a member of the community), who had observed through a one-way glass, then assigned a score to each of the five group members in the categories of group skills and problem-solving ability. They subsequently discussed their scores and could change scores if desired. The assessors worked as teams and had previously been oriented by observations of a very effective "live" tutorial group of medical students and a videotape of a much less effective group of applicants of a former year. The simulated tutorial planners pointed out aspects of the two different groups' performances which were relevant to the characteristics being assessed.

C. Interview Scores

The scores for each applicant in the two parts of the interview were combined, with the individual interview being given

heavier weight. This combined score was used to reduce the number of applicants for further consideration from 450 to 225.

8. Collation

The complete file of each of the 225 applicants was then reviewed in a process which we have called collation. The collation group was made up of 12 members of the Admissions Committee, i.e., those responsible for each part of the process previously described, together with three medical students and one member of the community. Each file was independently reviewed by two members of this group, each of whom arrived at a recommendation and then met to discuss their decisions. They then presented their recommendations to the entire collation group. When the original reviewers had been in disagreement or both had been undecided, the decision was made by the entire group after presentation of the relevant data by the reviewers. The file review involved a search for evidence to fortify or negate any reservations expressed by assessors at any stage in the process.

Thus, until the stage of collation the various selection methods were applied independently and sequentially. At the stage of final review and class selection, a cumulative assessment was made using all the information in the file.

"SPECIAL APPLICANTS"

In 1976 it became possible for people without a typical university education to be admitted to the program. By this means it is hoped that the selection base may be expanded. To do this effectively in the Canadian educational system, it appeared necessary to go beyond the university community. The hope is that this will make the profession more accessible, both in feeling and in fact, to a broader section of the population.

The criteria for acceptability for such people were that they were residents of the Hamilton Health Region or Northwestern Ontario, that they were at least 24 years old, that they had demonstrated the ability to function in an academic setting by achieving suitably high grades in the equivalent of four university extension courses in one calendar year, and that they had made an exceptional contribution to society. Since this special

category was announced only in the late summer of 1975, few special applicants have been able to fulfill the academic eligibility criterion.

Sixteen applications were, however, received. A sub-group of the Admissions Committee reviewed these applications with a view to assessment of the criterion, related to special contribution and this group recommended that three out of the 16 be interviewed. From the stage of interview onward, the same criteria were applied to this group of applicants as to all others. Of the three, one was offered a place in the class which entered in September 1976.

RESULTS

While results are difficult to assess, some information is available.

1. The Process

Representatives from the four groups of assessors, i.e., medical students, community at large, community physicians, and full-time faculty, continue to volunteer for the various time-consuming activities. They view their roles as important. An indirect benefit has been the friendships and insights gained, especially by members of the interviewing team.

2. Class Composition

The prerequisites for eligibility and the selection methods have yielded classes whose composition is somewhat different from the usual medical class. About one third of each class has been made up of students who lack any extensive exposure to sciences at a university level, and there is a higher proportion of B grade students than A grade students.

Women applicants have performed better in the selection process than have men, as judged by the percentage of successful applications. Over the last three years an average of 47% of the places have been taken by women, although they constituted 29% of the total applications. This result has not been due to any weighting in the process.

Geographic weighting at the stage of selection for interview has resulted in 50-60% of the places being taken by students

from the Hamilton Health Region and Northwestern Ontario. Twenty-seven applicants from the latter region have been accepted in eight years.

The average age of the students in 1976 is 24, slightly higher than for most other schools of medicine.

3. Performance in the Program

Performance studies are difficult to do since no grades are assigned in the program. Students are assessed as satisfactory or unsatisfactory, and the frequency of the latter assessment is low.

The students who have encountered academic difficulty during the program have not been from any particular group. We thus assume that undergraduate grades and course backgrounds have little influence upon performance in the program as presently measured. Similarly, the students failing the Medical Council of Canada examination are from various backgrounds and academic records. The average percentage of students who fail one or both parts of this examination has been 8%.

In seven years, five students have dropped out. Two of them are presently in another medical school and three in other careers. No student has been compelled to leave. This might appear to be an indicator of a successful admissions process, but it may be misleading because a very large investment of faculty time is made to help students achieve a satisfactory standing; some students repeat sections of the program, and some take leaves of absence. Whether these people could complete the program if the system put less emphasis on remedial action is difficult to say.

4. Performance Following Graduation

For the five classes that have graduated, the choice of residency programs is similar to the profile of other Canadian schools, with approximately half choosing Primary Care programs and half choosing various specialty fields.

The initial group of students selected from Northwestern Ontario have all chosen Primary Care training and three of the five are entering practice in Northern Ontario this year.

Studies are under way to evaluate the long-term performance of McMaster graduates and to relate their performance to admissions data.

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DENMARK

Jørgen Worm-Petersen

FOR years Denmark has been looked upon with curiosity by those all over the world concerned with medical education because of the fact that despite free access to medical education the nation has managed to cover its needs for medically qualified personnel without experiencing overproduction. However, the growing affluence during the 1950s and 1960s has finally confronted Denmark with the realities of restricted access (*numerus clausus*), not only to medical education but to all university education. The decision to abandon the principle of free access to higher education was laid down in an act of Parliament of June 10, 1976, and was applied to medical admissions for the term commencing September 1976.

Denmark is a small country with a slowly growing population —now 5 million—which has enjoyed a smooth and rather harmonious economic and social development over a century or more. The economy has been based on agriculture, trade and crafts, and to a slowly increasing extent, on industry.

In such a society the need for academically educated manpower was limited and stable for decades, and the influence of the professions on society was proportionally low. Neither the standards of living nor the social status of the academic professions attracted youngsters without a family background in these professions. This is one of the main reasons for a limited and balanced development of the public demand for higher education until two decades ago.

The change, already in progress before World War II, from a predominantly agricultural society to an industrialized society,

took place in the early 1950s. Among innumerable other consequences this progress changed society's demand for highly educated specialists and brought a rapidly rising social status to the professions. Accordingly, the incomes of these groups increased more than for other groups. These and other changes in the society have altered the attitude to higher education so that a continually growing number of young people seek higher education.

For more than a century it has been the declared public policy that access to education at university level should be free to all qualified persons. Universities, other educational institutions of the same level, and schools have always been under the control of the central government and financed by public authorities. Private schools have played a minor role in the educational system. The programs of teaching and examinations have been the same for both public and private. The statement that all teaching is equal is a reality at school level in Denmark.

As a consequence of the concept of free access to higher education for all those qualified, and of the central government's financing of universities and comparable institutions as well as of secondary schools (in Denmark called *Gymnasia*), no tuition fees are required. However, this does not imply that accommodation and board are also offered free of charge. Public grants to cover students' living costs have up to the last decade been inadequate to allow everybody to pursue higher education even if intellectually qualified. Loans for education could be arranged only on a private basis. No doubt some restraint on access to higher education has been maintained by the government through this mechanism, although this has never been admitted by any Danish government.

A third, and in my opinion the predominant factor in the control of access to university level education, has been the restriction of capacity in the secondary school stream leading to university to the needs of the society for academically educated manpower. In a small, homogeneous, and effectively administered society, this has not been difficult to achieve.

Such a provocative statement calls for a short description of how the school system operated until recently.

Education in school was divided horizontally into sections, and moving up from one section to another required certain qualifications which could be fulfilled by only a minority of the pupils. Of course this mechanism does not operate at school entrance, but only two decades ago it applied at the end of the 5th grade, i.e., at the age of 12. The minority went on to an academically oriented four-year school while the majority entered vocational schools. At the end of the academic school a final examination again excluded the majority, leaving a minority to enter the three-year *Gymnasium*.

There is now a strong tendency to avoid such selection and within a few years the implementation of new regulations will postpone selection to the end of 9th grade, i.e., at the age of 15. At this level approximately one-fourth of the pupils enter the three-year *Gymnasium*, having gained access to it by an examination.

Most of the youngsters who are accepted for the *Gymnasium* pass the final examination. Only this qualification opens the door to all higher education at university level. However, some faculties and institutions at university level now grant exemption from the official qualification, and a trend to weaken the rigid demands for specific qualifications has been obvious for some years.

ACTUAL EXPERIENCE

The foregoing description may give the impression that *numerus clausus* admission control is exerted at the entrance to the *Gymnasium*. This is not altogether the case. For generations not all those graduating from the *Gymnasium* have entered higher education. Many turned to commerce and others to practical training programs. Nobody has tried to answer why a fairly constant proportion of each year's *Gymnasium* graduates have entered medical study.

By adjusting the total educational system and probably also indirectly through adjustments in student grants, the system has worked fairly well for many decades. The Danish society has never suffered from an overproduction of physicians except for

a few years before World War II. Nor has it suffered from a lack, although some may argue this. Compared to other countries Denmark has enjoyed a rather balanced supply of physicians to meet its medical manpower needs. Table 1 gives population statistics on this situation since 1925.

TABLE 1
Growth in Population, Graduates from Gymnasium, and Physicians in Denmark 1925-1975

	Population (millions)	Graduated from *Gymnasium* and equivalent	Physicians		Ratio physicians to population
			Graduated in the year	Total active	
1925	3435	1327	107	2175	1579
1935	3706	1758	131	3011	1230
1945	4045	2807	198	3995	1013
1955	4448	3132	247	6274	709
1960	4585	4468	235	6475	708
1965	4768	8958	247	6408	744
1970	4938	13638	495	8575	576
1975	5054	17392	743	9670	523

The affluent society has a tendency to develop affluence of educational opportunities, qualitatively as well as quantitatively. The general political philosophy of free access for everyone to the desired level of education has, together with increased affluence, resulted in expanding the capacity of those sections of the school system which were restricted two decades ago. Furthermore, examinations within the school system have been abolished or very much relaxed, thus leaving to pupil and parents the decision on whether to continue into academic secondary education. The intention was to offer a much higher level of education to a much larger part of the population. Finally, the expansion of public grants and the introduction of public loans for students have eased financial constraints.

CONSEQUENCES OF FREE ACCESS

Only in the last few years have the consequences of the concept of free access to any desired education become clear to the

public and the politicians. The universities' warning for some years had not been taken seriously. The capacity of *Gymnasia* and higher education has been expanded enormously to accommodate the fast growing number of students claiming their right to free access. Danish society has been wealthy enough to pay the bill of free expansion of the educational institutions, but within the last two years Parliament has asked the government for restrictions.

The steeply increasing number of graduates from the universities concerns the politicians more than the increase of the costs of higher education. The recent worldwide depression has also called for economic restraints. Unemployment is a reality for most categories of graduates and even for the medical profession unemployment became a reality as of 1975. Table 2 is a condensation of the statistical data and prognoses prepared in the last few years to demonstrate that Denmark must undertake a major change in an admission policy which had been viewed as an indispensable cultural heritage. Needless to say, the process has been painful and the debate ardent.

TABLE 2
Expected Number of Graduates from Gymnasia[1] and Medical Schools[2] and the Consequence for Physician/Population Ratio

	Graduates from *Gymnasium* and equivalent	Physicians		Ratio physicians to population
		Graduated in the year	Total active	
1975	17392	743	9670	523
1980	19500	750	12300	420
1985	–	700	15300	340

1. According to public plans for school development.
2. If free access had continued.

THE NEW REALITY

During 1975 it became clear that a majority in the Parliament wanted restricted admission to medical education and preparations for new legislation were begun. In June 1976 Parliament passed an act to introduce restricted admission not only to

medical education but to all higher education, to be implemented by the faculties of medicine September 1976 and for all other higher education by September 1977.

Few persons in Denmark deny the need to control the output from universities and other institutions of higher education. The public interest in a balanced and efficient health organization is generally admitted, and yet there is no generally accepted means to determine a given society's optimum need for doctors. Most planners in the health sector agree on the gap between the public demand for medical manpower and the need as determined by more substantial parameters. Many nations have had experience with almost disastrous miscalculations of future needs for physicians because the prognoses were wrong and resulted in an insufficient production of physicians for years. Denmark, now at the point of introducing limited admissions to medical education, is in no better situation. An overproduction of physicians is already in progress and will continue from the last year of free admission (1975) for the duration of the average six-and-a-half years spent by most students on medical education, i.e., to 1982.

With this background it is hardly surprising that the decision on the future number of graduates from medical faculties has not raised much debate. It has been decided to aim at 600 graduates per year or approximately two-thirds of the expected output without restrictions. A major argument is that the capacity for postgraduate clinical training in hospitals according to agreed training schemes is around 600 physicians per year.

ADMISSION CONTROLS

In Denmark, the chief point of disagreement centers on the qualifications on which an applicant should be accepted. The issue is somewhat different in Denmark than in other countries; tradition has much influence. Free access to higher education in Denmark has for generations meant that those going to universities had to face a high risk of being weeded out after one or two years because they could not pass the preliminary or introductory examination after one year of study or even after second and third attempts. An average of 40% of those starting in medicine never graduate in medicine.

University teachers have always claimed that the aim of this sorting out after one year of study is qualitative only and not intended to restrict the number of students continuing their studies. Nevertheless, some teachers and students in the medical faculties now argue that it is possible within the framework of the medical curriculum and the educational tradition of the medical schools to use the early examinations as an admission control when this has to be introduced.

They argue that the aim of these examinations is to sort out within the first or second years a fairly large proportion of the students not intellectually capable of further medical education. Such early examinations, they argue, are the consequence of the free access for all graduates from the *Gymnasia*, as it cannot and should not be the aim of the *Gymnasium* to prepare and sort for higher studies. The *Gymnasium* merely provides a broad general education in academic methodology and thinking, and may not give the individual student the basis to judge his own capability regarding the demands of any given field of study at university level.

The Ministry of Education and its advisory bodies opted to place the decision on admission before entrance to the study. The advisory bodies argued that it is a waste of educational resources to allow a much larger number of students into the first year than can be accommodated in subsequent years of medical education. It was also claimed that it is doubtful whether examinations truly relevant to the wanted intellectual and psychological qualifications for future medical studies and professional work could be based on only one year in the medical faculties. Finally, it is in the interest of society and especially of the students to be placed as early as possible within a study from which they are not later expelled because there are too few places and too many better-qualified students, even though the students expelled have the basic qualifications for study.

From the point of view of the German-U.S. Study Group on Access to Higher Education, it is a pity that the opposing views on basing the evaluation of qualifications for future medical studies and professional work on examinations after one year of medical education have not been analyzed in a major

publication. While Denmark cannot yet contribute much new to the international debate on this subject, many Danes are presently concerned about the problem of criteria for admission to medical education.

REQUIREMENTS FOR ADMISSION

The Ministry of Education has defined the following requirements for admission:

Passed final examination after three years education in the *Gymnasium*, equivalent to U.S. high school.

Or passed a so-called higher preparatory examination, more or less comparable to final examinations in the *Gymnasium* with, however, a somewhat narrower range of subjects. The subjects chosen for examination must be relevant to further biological education in a broad sense.

Some—and hitherto very few—students are admitted on the basis of other qualifications for which faculties grant exemption from the above-mentioned requirements.

Grades or marks in all examinations in Denmark are expressed in a numerical scale of 0-13 where 8 is defined as the average level of performances by the examinees in a given subject.

The three faculties of medicine must, with the help of a central registration of applicants, admit students according to the following key of distribution:

50% are admitted according to the average marks achieved at graduation from *Gymnasium* or equivalent. In September 1976 students with an average of 8.2 or more were admitted, those below were refused. It will probably take years before a stable level of marks assuring admission can be achieved and the level may well move somewhat upward.

40% are admitted on the basis of the average marks achieved at graduation from *Gymnasium* or equivalent plus a "bonus" in points added to the examination result for experience in practical life. Not less than ten months of experience within paid practical work (i.e., not other studies or unpaid voluntary work; compulsory military service is equivalent to paid work) add an additional 0.10 points; 25 months of work add 0.25 points. Additional work cannot add more points.

Not more than 10% are admitted following the faculties' tradition of granting an exemption from the qualifications normally required.

Places not filled by applicants within the second and third of these groups are transferred to the first group. It is expected that this will happen to some extent. No preference is given to women or any ethnic group. Non-Danish students can be admitted only to the third group, but will normally be refused. If they pass a Danish examination at Gymnasium level, have lived in Denmark for a long time, or have close Danish relatives, they are treated as belonging to the first or second group, despite their nationality.

MEDICAL CURRICULUM AND DISTRIBUTION OF THE STUDENTS

Each year is divided into two terms of five months. However, students enter only once a year.

Part 1, preclinical period:

1st year: physics, chemistry, genetics, statistics, and psychology

2nd year: biochemistry and anatomy

3rd year: anatomy, psysiology, biophysics, clinical psychology and medical sociology

Part 2, clinical period:

Three and one-half years of clinical education combined with the usual paraclinical education. Some major subjects are taught for parts of the period, and tested by examinations so that most terms end with examinations in some subjects.

The examinations in the preclinical years have until now and are expected in the future to sort out a substantial proportion of the students. Until now the drop-out figure has been 40%. The number of admissions now introduced is based on an expected dropout of 30%. No one has attempted to more than guess at what the dropout will be after the introduction of restricted admission. My guess, based on the experiences of other countries, is a much lower dropout. During the clinical years dropouts are negligible and mostly due to illness and emigration.

The annual distribution among the three university faculties of medicine under controlled admission is:

University of Copenhagen	470
University of Århus	250
University of Odense	130
	850

The expected number of medical students per year in the clinical training, identical to the expected number of medical graduates per year by 1983 (6½ years after admission) is:

University of Copenhagen	330
University of Århus	180
University of Odense	90
	600

It is understood that the Ministry of Education will adjust the admission figures to the experience with dropouts so that the number of graduates will continue to be the determining factor.

Despite the high figures for the University of Copenhagen faculty of medicine, this university has experienced the highest reduction in student numbers with the introduction of controlled admission. This has taken place even though the capacity for clinical education in the Copenhagen metropolitan area is large, with about 1.5 million inhabitants and a high proportion of fully specialized major general hospitals.

The clinical part of medical education in the Copenhagen faculty of medicine is divided among *three* medical schools:

The government-owned University Hospital (Rigshospitalet) will take 150 clinical students per year;

The Municipality of Copenhagen hospital group will take 90 students per year;

The Copenhagen county hospital group will take 90 students per year.

ADMISSION POLICIES AS A MEANS OF EQUAL OPPORTUNITY

As a society in which the overwhelming majority supports the ideas of the modern European welfare state, there is a strong political demand in Denmark for the youth to have an equal opportunity to achieve the level of education for which they

have the intellectual capacity. There is also a demand for a more equal geographical distribution of opportunities for education throughout the country. This is the reason for a stronger reduction in numbers of admissions in Copenhagen than in the two provincial universities. The distribution of capacity now introduced accords better with the distribution of the population.

Education in schools as well as universities has always been free of fees in Denmark and yet the problem of equal opportunity in relation to the cost of medical education has not been fully solved. The cost of living must be carried by the student and his family. Public grants are available to some—compared to many countries to a high extent—and loans for financing one's education are guaranteed by the government. Nevertheless, the costs of living are not negligible and rates on loans have climbed to a level which makes them very expensive.

Among the young people entering education for the professions, whether in universities, technical universities, or other comparable institutions, there is still an overrepresentation of men and women with a family background in the academic professions, civil service, school teaching and other groups of what rather archaically may be called middleclass families. This is certainly not the result of economic inequalities only, as most of the students from these families are more or less dependent on loans. A family tradition of intellectual life when the children are young as well as later on is an equally determining factor.

Factors difficult to account for in micro- as well as macrosociety which affect children and influence what sort of role they want to play when grown up may well influence the desire for a medical education much more than mental ability and the willingness to pay for living costs as a medical student. I doubt that this will change with the introduction in 1977 of restricted admissions to all higher education in Denmark. Thus, the sudden shift from free access to restricted access may not be followed by any major change in the medical student population and ultimately in the medical profession. Put another way, I am not willing to accept that the quality of the medical profession depends on the nation's admission policies rather than on the quality of the education offered.

FRANCE

Pierre Pene and B. Antoine

EACH medical school (Teaching and Research Unit—UER) is affiliated with a hospital center where the clinical instruction of students is given. The whole of a UER Hospital Center constitutes a University Hospital Center (CHU), and two or three UERs can be affiliated to the same Hospital Center. There are 11 CHUs in Paris and 26 in 26 other towns.

There are 44 medical schools, 142,000 undergraduate and postgraduate students (40,000 are in the first year of the first cycle), and 11,400 medical professors and assistants. The staff/student ratio is 1:12.7.

The curriculum requires seven years. The undergraduate curriculum is divided into two cycles. The first cycle is two years. Since 1972 selection has been carried out at the end of the first cycle. The selection examination (*numerus clausus*) focuses exclusively on the basic and biological sciences.

Medical Corps

France in mid-1976 had 90,000 doctors, for a population of nearly 53 million. The notable increase in the number of physicians has been evident in the course of the past 15 years, as is shown in Table 1.

But in 1976 the medical density varied a great deal from one region to another. There is an overpopulation of physicians in certain cities (general practitioners and specialists) with sometimes one doctor for less than 400 inhabitants, while in certain rural areas there is sometimes one doctor for more than 2,000 inhabitants. The setting up of practice by a large number of new

TABLE 1
Doctors–Population

Year	Population in millions	Number of Active doctors*	Doctors per 100,000 Inhabitants	Number of Inhabitants per Doctor
1960	45	50,000	111	900
1965	48	60,000	125	800
1970	50	72,000	144	694
1976	53	90,000	170	588

*The term "doctor" is used here with the following definition: holder of the university degree of Doctor of Medicine, with a professional activity involved directly or indirectly with health care of the French population. The number of physicians will increase further during the coming years.

doctors in the course of the last few years may correct these disparities, as is indicated in Table 2.

Access to Medical School

Entrance to medical school as to all other university faculties (liberal arts, sciences, law, and economics) is in theory open. This means that there is no selection or acceptance requirement before a student can register in the faculty of his choice. This is a fundamental principle. All holders of the final diploma (*Baccalauréat*), upon the completion of secondary school, are authorized to register in any sector of public higher education which is part of the university. Only the *grandes écoles* and the Veterinary School, which are not university establishments, impose rigorous competitive examinations to establish the right of entry. The same applies to numerous other nonuniversity establishments responsible for the education of engineers, business executives, and others.

The *Baccalauréat* is taken after six years of primary studies and seven years of secondary studies. School education is compulsory from the age of five years. Assuming that no years are repeated, the *Baccalauréat* is taken at 18 years of age. There is a series of *Baccalauréats*, known by letters, A, B, and so on, according to the focus of secondary school studies.

TABLE 2
Prediction Doctors–Population

Year	Population in Millions	Predicted Number of Active Doctors	Doctors per 100,000 Inhabitants	Number of Inhabitants per Doctor
1980	54	118,000	218	458
1985	55-56	150,000	268-273	373-366

Due to the constant increase in the number of students wanting to enter medical school, since 1970 there have been a number of conditions required of applicants:

§ For the French students, it is necessary to be residents of the geographic area in which they are applying and belong to the Academy (geographic regions based on the administration of all education by the central government) on which the medical school is dependent and of which it is a part.

§ Foreigners holding the French *Baccalauréat* or an equivalent degree are authorized to apply under special conditions, including an adequate knowledge of the French language. The foreign student registration in medicine may not exceed 5% of all registered French students.

A. Medical Students

The total medical student enrollment in the three cycles is slightly more than 142,000; this is out of 820,000 students in all French universities.

◇ 40,000 are in the first year of the first cycle (before selection);

◇ 68,000 are either in the second year of the first cycle or in the second cycle;

◇ 34,000 are postgraduate students in the third cycle (specialized training).

The profile of the candidates at first year registration is important. It shows the following:

◇ 20% are less than 19 years old;

◇ 67% are from 19 to 21;

◇ 13% are more than 21 years old.

Female medical students have increased from 36% of total enrollments in 1970 to 46% in 1976.

Medical students come from the following series or type of the *Baccalauréat*:

- ◇ 60% of candidates registered in $PCEM_1$ (first cycle of medical school curriculum) come from series D (mathematics and biology);
- ◇ 30% from series C (mathematics and physics);
- ◇ 10% from other series (philosophy, literature, social economy, technical).

The percentage of students with scholarships is approximately 8%, a figure that corresponds to the students whose parents' income is modest.

It is difficult to classify students according to their social origin since the professional span is so wide. However, one can safely say one out of six students is the son or daughter of a doctor and that about two out of three students are of upper- or middle-class backgrounds.

The attraction toward medical studies in the past decade has been analyzed to show a regular increase since 1965 in the number of bachelor degree holders attracted to medical education despite the recent establishment of a selection system in 1972. In 1974 a comparative analysis made in Marseilles and at the Necker-Enfants Malades Faculty of Paris resulted in the following profile of candidates, according to the *Baccalauréat* group at the time of the first admission (Table 3).

B. Cost of Medical Education

The UER and university budgets are totally financed by the government. It pays faculty salaries and operating costs, and supports research. Tuition costs are very low, less than $70 per year.

Selection Process

A selection process (*numerus clausus*) instituted by governmental decision became effective in 1973. The number of admissions is determined each year by a Central Office in Paris for each university hospital center. In theory the yearly number of positions is around 8,500 for the 37 CHU.

Of the 40,000 students in the first year of the first cycle, only 10,000 survive the end-of-year selection process. Attrition is about 15% at the end of the second year of the first cycle, thus producing roughly 8,500 diplomas a year. Selection takes place at the end of $PCEM_1$ because it is not possible in admission to the medical faculty, as this, theoretically like the whole university, has open admission.

TABLE 3

Group	Necker (Paris V)	Marseilles
A and B	8.2	13.7
C	30.6	19.3
D	56.5	62.4
Others		
E, F, G and former Bac. and equivalents	4.7	4.6

The selection process has become an urgent issue for several reasons:

1. The increasing number of bachelor degree holders. There were 32,362 in 1960 and 153,685 in 1975. A large number of these would like to become doctors because, under the comprehensive scope of the social security system, the medical profession is considered lucrative. Furthermore, doctors enjoy a high status and prestige in society.

2. The necessity to create a balance between the nation's health care needs and the supply of doctors available to meet these needs.

3. The impossibility of fitting large numbers of students in the hospital. This last condition is one which the government used to obtain the support of students and public opinion for a system of selection.

If the selection process and program are clear, the objectives and modalities of the instruction are left to the initiative of each institution.

The first year of the first cycle constitutes a common core for both medical and dental studies because selection is effected at the same time for both, that is, for admission into the second year of the first cycle of medical school and second year of dental school.

The selection process is criticized for the following reasons:

1. The percentage of students who succeed varies among medical schools. The minimum performance level required of the candidates varies according to the medical school. The chances of passing after two years varies from one out of four to one out of two. Table 4 shows some of the percentages in 1974.

TABLE 4
Percent of Successes per Town

Town	%
Nice	26
Aix-Marseilles	33
Paris VI Broussais	35
Strasbourg	42
Lille	49

2. The admission in relation to the series of the *Baccalauréat* reveals that the chances of candidates with series C *Baccalauréat* are superior to those coming in with series D, while the chances of students having series A, B, or others are very poor. For example, at Paris-Necker in 1975, the percentage of successful candidates per *Baccalauréat* group were as follows (Table 5):

TABLE 5
Percent of Students Admitted to PCEM$_1$ and Successful in Relation to *Baccalauréat* Group

	% Admitted	% Successful
Series A and B	8.2	1.5
Series C	30.6	53.7
Series D	56.5	43.1
Other Series	4.7	1.7

Group C (mathematics) gives the highest percentage of success. It is followed by Group D (biology) which is advised as a *Baccalauréat* option to be taken during secondary studies for orientation three to four years later toward medicine.

3. An increase in the number of medical students repeating the first year of the first cycle has become a common practice since the selection system became effective. The number of students who are eliminated after repeating is considerable. For these students there is a loss of two years. Table 6 shows the percentage of students successfully completing the first year after one year and after repeating it. Table 7 illustrates the repeater problem.

TABLE 6
1974 Admissions

	1st Admission	Repeat Year
Nantes	17%	31%
Strasbourg	35%	47%
Tours	20%	31%

TABLE 7
1st Admission and Repeat $PCEM_1$

Year	1st Admission	Repeat	% Repeat
1965	10,870	3,189	29.4
1968	21,028	5,175	24.6
1970	17,593	7,136	40.5
1976	23,878	16,339	68.4

Since $PCEM_1$ may be repeated for a second time (i.e., third attempt), under exceptional conditions, the number of repeat students eliminated is considerable. These individuals have effectively lost three years of study, which should lead to new and improved criteria of orientation for the approach to medical education.

In three Paris Faculties (Necker, Cochin, Paris-Ouest), repetition of $PCEM_1$ is indicated in Table 8 for the years 1975 and 1976.

TABLE 8
Percent Repetition 1975-1976

Year	1st Admission	2nd Admission	%
1975-1976	1,861	911	48.90
1976-1977	1,805	1,089	60.33

Selection System not Satisfactory

The admission-selection system is not satisfactory. There are far too many students in $PCEM_1$. These students consider themselves to be medical students, but one out of two will be eliminated after having lost one or two years. Bridging links toward other health care professions are practically nonexistent. Less than 10% of the students eliminated after $PCEM_1$ enter these professions.

Teaching, when given to such large numbers, does not permit the development of qualities of analysis and reflection, and is dependent above all on memorizing facts. The reliability of the measuring instrument is open to criticism and selection methods reveal considerable regional disparities. Much time is wasted. In the large faculties, teaching staff must repeat their courses at least three times before groups of 600 students.

In 1976, the total number of students in $PCEM_1$ was 40,217, or 26.7% of the total number of students in all cycles, which is slightly greater than 150,000. For purposes of comparison, the total number of medical students in December 1965 was scarcely more than 50,000. If selection had not been imposed in 1972, from 1985 onward France would have been submerged by an even greater outpouring of doctors than it now faces.

An estimate of the number of students undertaking specialized studies (third cycle) and the number who are waiting to enter practice, indicates a figure of 42,000 doctors who will go into practice between now and 1981 (none of whom were subjected to selection).

Thus, a drastic limitation in the number of doctors is required, involving even more severe selection at entry, more rigorous surveillance during studies and possibly cumulative selection at the end of studies. However, present moves involve only selective preorientation through the development of a "medical" *Baccalauréat*, preparing for the Faculty of Medicine and possibly other health care professions, taking into account classifications obtained at a regional level. Public opinion on the one hand and the teachers and students on the other are not ready to accept such measures.

There could thus be a decrease in the numbers in medical faculties and improved education if the flow were limited and corresponded roughly to the number of places currently open after examination at the end of $PCEM_1$. Although this solution has definite advantages from the education standpoint, it has a disadvantage from a university point of view.

Since finances and the number of teaching posts are provided to the UER by the state on the basis of the number of students and the surface area of buildings, using a coefficient according to the university discipline involved, any decrease in the number of students in $PCEM_1$ would be associated with a decrease in the number of teaching posts and in financial support of medical UER.

It is for this reason, rather than the improbability of a radical change in public opinion, that selection is likely to be maintained as it is today.

More and more young French men and women are attracted to medical studies. The need for selection at the end of the first year of studies was only accepted in 1971.

Up to the present time this has had no influence and finally will have a small influence on the flow of new doctors who are about to submerge the French medical profession. While in the past attrition was progressive during the course of studies, it now focuses on the end of the first year, and the final output in percentage terms at the end of the total period of studies is only slightly less than that before the imposition of selection.

It is now thus almost impossible to avoid a two-fold increase during the coming 15 years in the French medical profession,

which will increase from 95,000 doctors in 1977 to approximately 190,000 in 1992.

New measures, even extremely severe, could only slightly decrease this inflationary process, given the mass of 150,000 students already engaged in medical studies, the average duration of which at the present time is on the order of ten years, the pressure of recently successful *Baccalauréat* candidates, and public opinion which is based on little comprehension of this problem.

FEDERAL REPUBLIC OF GERMANY

Hans E. Renschler

TODAY'S conditions at West German universities are still a consequence of the conditions created early in the 19th century and more impeded than improved by the Kaiser; they are based on the social structures which had developed in reaction to the inequalities previously prevailing in the German society. James B. Conant came to the conclusion that the German educational system, as he studied it from 1963 to 1965, was not essentially different from what it had been before the first World War (Conant).

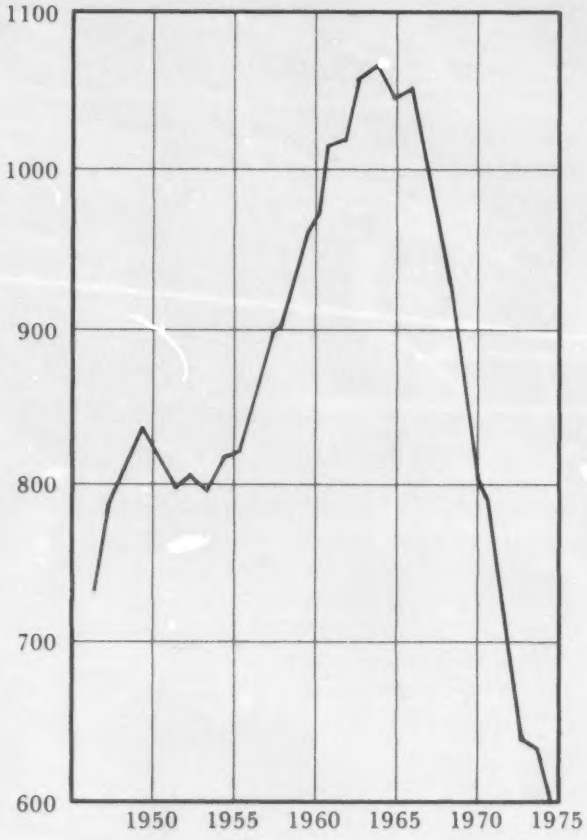
Today, any reforms taken have to be in accordance with the Basic Law (Constitution) of the Federal Republic of Germany. According to Article 12, "all Germans shall have the right freely to choose their trade, occupation, or profession, their place of work and their place of training." Article 12 has been reinforced by recent decisions of the Federal Constitutional Court. It reflects the ideal of a liberal education which was regarded by Humboldt as one of the basic human rights. Today arguments are carried on as if Humboldt had been successful in putting his plans into effect (Menze). The supreme criterion for any measure to select and admit students to higher education is its legal and political acceptability. This has led to new legislation which will exert greater control over the universities and still more drastically reduce their freedom of action.

Growth of the Demand for Higher Education in Germany

The number of students qualifying for higher education has shown a continuous rise since the end of the last war, interrupted only by an intermittent minor decrease around 1965. This was

caused by two factors: an increase in the birthrate approximately 20 years earlier and an expansion of secondary education in general. Following the postwar economic recovery, the birthrate in Western Germany showed a conspicuous peak in 1965 and a subsequent decline with an estimated minimum between 1975 and 1980 (Figure 1).

FIGURE 1
Development of the Birthrate in Western Germany Showing the Annual Number of Thousand Newborns



Simultaneously, the percentage of students who complete their secondary education is steadily increasing. From 4-5% in the early postwar years, the national average of students qualifying for higher education rose to 13.3% of the age group in 1973-74 and is expected to reach a maximum of 27-30% between 1975 and 1980, and later to level out at 24%. The absolute number of students annually qualifying for higher education rose from 30,000 in 1955 to 90,000 in 1970 and to 183,000 in 1975. It will reach an estimated peak of approximately 300,000 in 1985 and will then slowly decline, returning to the level of 1970 around 1995. At the same time the percentage of applicants seeking admission to medical education of the total number of applicants for a university education rose as well. Before restrictions were imposed on the access to medical education the percentage applying for medicine increased from 7.5% in 1953 to 11.1% in 1959 and to 12% in 1966. Due to a long waiting list the percentage of applicants for medical schools dropped to 8.8% in 1975 and to 8.4% in 1976. The "selection by endurance" of medical students which will be referred to later on in this paper is a unique feature of Germany. It means that 40% of the admitted students are selected from a waiting list having a maximum length of eight years. If this practice is going to be maintained, a tolerable ratio of applications to admissions will not be attained before the end of the century.

In 1834, university entrance examinations were abolished in Prussia. Since then it has become a German tradition that the completion of secondary education guarantees the right for admission to higher education. This, in turn, has almost become the exclusive goal of all secondary education, as 85-90% of those qualifying from secondary education intend to proceed to tertiary education. This figure has just recently dropped to 79% in 1975, and to 75% in 1976. There exist very few careers in industry or commerce which can be entered between the ages of 19 and 21 years on the basis of the school leaving examination, the *Reifezeugnis* or *Abitur* (certificate of maturity). Striving for higher education has become a goal in itself, independent of the applicability of the vocational training received at the university later in life. Still being used to the conditions of an expanding

society and economic growth it is difficult for the Germans to face the limitations that have already started to take shape. Since 1971, the death rate has exceeded the birthrate, resulting in a continuous decrease of the population in West Germany. Motivation to enter higher education is supported by the fact that the rate of unemployment is lower with professionals than with manual laborers, though the number of unemployed professionals increased at a rate of 30% from 1975 to 1976. In comparison, the number of unemployed laborers slightly decreased over the same period. According to a representative review in 1976, the salary of university trained managers in industry and commerce exceeds that of their colleagues without a tertiary education by 26-46%, though only 16-48% of the managers at the three top levels have had a university education, and 33-53% have had no tertiary education at all.

Secondary Education in West Germany

The Constitution of the Federal Republic of Germany gives all powers in educational matters to its eleven member states (*Land*, pl. *Länder*). Only in tertiary education has the federal government a right to put up a framework for the legislation of the *Länder*. Nevertheless, only minor differences in the educational system developed since the disappearance of the centralized government in 1945. Though the legislation permits private enterprise in education (Article 7, Section 4 of the Basic Law: "the right to establish private schools is guaranteed"), almost all responsibility lies in the hands of the communities or the individual state governments. At the primary level, comprising grades 1 through 4, all schools are uniform with only a very small proportion run by private institutions or churches. At the secondary level which usually starts after four years of primary school, the prevailing school preparing for university is the German high school, now again called the *Gymnasium* all over Germany, as in the times before the development of science education. Since the end of the last century there have been three major types of high school, concentrating on languages (either modern or, in a few cases, classical), or on sciences and mathematics. Some *Gymnasium* schools concentrate on technical subjects, like

engineering, economics, music, and social sciences. The general application of the term *Gymnasium* to all types of high school reveals an intention to revive the stern, solid, and complete style education highly praised by Flexner in 1930. The final examination, taken after a minimum of nine years in secondary school and leading to the "certificate of maturity" gives the right of admission to any type of higher education, irrespective of the courses the student attended at the *Gymnasium*. This will be legally maintained though the increasing number of students can no longer be accommodated by the universities, and new methods of selection will have to be introduced.

A planned curriculum reform of the final three years at high school has reached an experimental stage, but does not meet with general and legal approval. The provisional regulations make only two major and two minor subjects compulsory for the last two years. One subject has to be selected from each of science, language, arts, and social sciences. This was intended to overcome the defects of the *Gymnasium* which Flexner had pointed out 45 years ago, namely the lack of individual initiative and freedom for the severely regimented student. The primary intention was to allow students individually to select subjects of their choice which best suited their educational needs. The great pressure being exerted by the all-decisive grade point average (GPA) impels students now to select subjects in accordance with the ease with which good marks can be gained.

For a long time only a small proportion of the total age group took up secondary education, with the children of nonprofessional families being underrepresented. In order to correct social inequalities in the recruitment of university students, new ways to enter higher education were opened. At the end of the fifties, night grammar schools and a special entrance examination for the highly gifted were introduced on a large scale and legally recognized in 1965. Furthermore, it was permitted to transfer from a technical college (*Fachhochschule*) which needs only the equivalent of eight instead of nine years of secondary education to the university level. Originally, this privilege was intended only for the best graduates. Due to the generous grading at the technical colleges and selecting university entrants only by the

grades, 25-30% of those qualified from technical colleges subsequently entered the university. In 1976, quotas had to be fixed for each subject varying from 1.3% for pharmacy and 2.4% for medicine to 28% for architecture.

The reforms of secondary education resulted in a great variety of premedical education. Table 2 presents some figures collected on 2,981 German students admitted to medical education in the summer of 1974.

TABLE 2
Various Types of Premedical Education of German Students Admitted in Summer 1974 *

	%	%
1. Gymnasium		
Type: Ancient Languages	13.1	
Modern Languages	33.7	
Sciences	26.5	
Others (Technical, Gymnasium, etc.)	7.4	80.7
2. Night schools and adult education		12.3
3. Technical colleges		3.1
4. Special entry examination		1.4
5. Foreign schools		1.3
6. Comprehensive schools		0.4
7. Others		0.8
		100.0%

*Based on figures of 2,981 German students admitted in Summer 1974.

As universities tend to keep to their revered history, they still expect a well-defined product from the *Gymnasium,* i.e., students educated to a uniform standard both in the *arts* and in *science.* The adjustment to a student body with a great variety of entrance qualifications is not facilitated by the fact that the responsibility for secondary and tertiary education is shared between two ministries in each of the eleven *Länder* governments.

A centralized selection system for university education, as it is now in force, demands uniform criteria all over West Germany. All grades should therefore have equal standards. As there is no centralized testing system for secondary education, grades are

not comparable from year to year, school to school, or even *Land* to *Land*. This was confirmed by two studies in 1970 and 1973 using identical achievement tests to investigate differences between schools, *Länder*, and, in the earlier study, on a worldwide basis, between nations (Schultze, 1974; Trost, Pauels, Schneider, 1976).

The mean results for each *Land* ranged from between 90 and 92% of the national average for West Germany to between 110 and 117%. It could be shown in one of the studies that there exists a correlation between the results and the percentage of an age group concluding secondary education ($r = 0.64$). With a national average of 13.3% the range extended from 9.9% for Bavaria to 16.2% for Hesse; the big cities reaching much higher percentages (Berlin 17.7; Bremen 20.8; and Hamburg 26.4%). The variation of the results from school to school within a *Land* was much greater than the variation between the individual *Länder*.

The introduction of a correction factor adjusting the average of the *Länder* to the national average is, therefore, justified. All the same, this correction means an injustice to applicants coming from schools with highly qualified students and norm referenced evaluations, as compared to *Länder* having a low average standard. This is not eliminated by the introduction of a second correction factor for the percentage of students concluding *Gymnasium* in each of the *Länder*.

The Medical Profession and the Health Care System

As in all countries, the progress of medicine requires a continuous increase in medical manpower. In Germany, the number of practicing physicians rose from 74,000 in 1953 to 123,000 at the end of 1975. Doctors' waiting rooms in Germany are still crowded, although in 1961 a demand of 83,000 to 93,000 medical doctors for 1975 had been predicted as compared to the present number of 123,000 (Heim). As the population rose from 52 million in 1955 to a maximum of 61 million between 1970 and 1975 the population/physician ratio decreased from 750 to to 440 at present. In a recent study for the Federal Ministry of Education and Science a need for 175,000 physicians was predicted for the year 2000 (McKinsey). Together with a decrease

of the population to 59 million this would result in a ratio of 340 people per practicing physician in 2000. An annual intake of 7,500 German medical students would be needed to supply this number of doctors.

Already, 10.2% of the gross national income is spent on health care, its proportion of the social budget increasing from 28% to 35% during the last ten years. As a result of the recession the need to reduce the cost of health care has become a matter of public concern which has almost led to a crisis of the present government. It has already caused a reduction in the occupancy of hospital beds. This may lead to a reduction in the full-time medical staff of hospitals which showed the largest increase in the medical profession—from 22,600 in 1960 to 60,000 in 1976. The number of physicians practicing exclusively outside of the hospital increased only from 49,000 in 1960 to 53,000 in 1976. Their working time per week is assumed to be greater than 150% of the working time of employees in industry, commerce, and civil service. For 90% of the population unrestricted access to "free" medical care is secured through a compulsory, taxlike national insurance system. This still provides, on the average, a high income for the medical profession. Therefore, a reform of the free admission to medical education is met with a lack of understanding everywhere.

Loss of Autonomy of the German Universities

Legally the universities enjoy great freedom under Article 5 of the Basic Law (Constitution) of the Federal Republic which declares: "Art and science, research and teaching shall be free. Freedom of teaching shall not absolve from loyalty to the constitution."

The universities have been, for more than a century, entirely dependent on the state for funds. All appointments for tenure are made by the *Länder* governments. Departments and university hospitals cannot be developed unless the state provides the money. Changes of internal organization and investment for major construction of buildings as well as any other kind of investment are ordered directly, or have to be approved by the Ministry of Science. The state also regulates the examinations

and curricula for medicine. The responsibility for health care and medical education is divided among many federal and state departments; at the federal level the following ministries are concerned: Ministry of the Interior; Youth, Family, and Health; Labor and Social Order; Education and Science; Research and Technology; Economy.

Even research funds are now mainly provided through the government budget, very little money being given directly by private foundations. Therefore, almost all important decisions are made and executed by the legally qualified staff of the civil service. The medical profession and educational specialists are not adequately represented. The major problem, as Conant saw it in 1965, is an unbalanced relationship between the government and the universities which also affects secondary education.

This was confirmed by a survey, carried out from November 1976 to February 1977, on behalf of the association of private foundations supporting science in West Germany. A representative sample of 5,000 members of all of the 47 German institutions of higher education, and covering all groups from research students to full professors, was interviewed. The relation between ministries and scientists was described as cooperative by 17% of the professors and 8% of the junior scientists. The majority of both groups rated it as "rather strained."

Medical Students and Faculties

Though the faculties have expanded and the number of full professors more than trebled since the first World War, the internal structure of the German universities and faculties has remained stable. In 1972 in West Germany 43,400 medical students were enrolled at 28 universities. The total staff consisted of 14,171 scientists (1966: 7,415; 1974: 16,323) of which (in 1972) 3,700 were professors or other teachers (1966: 1,006). The remaining 10,500 were junior scientists or medical residents; only the latter and the professors for preclinical subjects were working on a full time basis (*Wissenschaftsrat*). The standing conference of the *Länder* Ministers of Education and Cultural Affairs, in a recent declaration (April 4, 1976), found this an

adequate number of full-time faculty members, even in view of the expanded practical education and bedside training as required under the new curriculum regulations. This was endorsed by the Assembly of the Heads of the *Länder* Governments on October 27, 1976. Since then, a reduction of the staff has even started in spite of an intended increase in the intake of the medical schools to 10,000 students annually. The total number of medical students was planned to reach a maximum of 56,000 after 1980. It is realistic now to expect a maximum annual intake of 12,000 students, leading to a total number of medical students of more than 70,000.

In most of the universities, there is still a part-time dean elected for one year; he is supported by a full-time staff of one or two secretaries. Only the Assembly of West German Medical Faculties (*Westdeutscher*) has a budget for 50% of one full-time scientific administrator. All matters of education (undergraduate, graduate, and continuing), together with patient care and research are coordinated at the department level. The larger disciplines like internal medicine and surgery have more than one or two full-time professors in their departments. Two universities now have departments of medical education with a staff of three scientists each. Medical education is mainly coordinated by the Central Examination Office for Medicine and Pharmacy.

The Medical Curriculum and Examination

In 1970, after more than ten years of discussions between the faculties and the ministries, new regulations for undergraduate examinations came into force, requiring alterations in the curriculum from 1972 onward.

The major provisions are:

§ All examinations required to practice medicine on a scientific basis, with a minor exception in the last part, are of the multiple choice question type. They are developed and scored by a central office for medical examinations which was set up at Mainz in October 1972 through a treaty signed by all federal states. The central office cooperates with subject committees, their members being appointed at the suggestion of the national medical specialist societies by the director of the

examination office who is a high ranking civil servant. The responsibility for the examination rests with the examination offices of the individual states, but they are obliged to use the services of the central examination office.

§ There is one preclinical examination to be taken after a minimum of two years of university education in sciences and basic medical sciences (anatomy, biochemistry, physiology, psychology). The final examination for the clinical phase of undergraduate education is subdivided into three parts. The first can be taken after one year of clinical education. The second part, also consisting of multiple choice questions only, can be taken after the first part of the examination and after a total of three years of clinical education which is mostly given as lectures. There are classes in the laboratory and bedside teaching for a few hours per week. Only the final or sixth year provides three clerkships, two of which have to be in internal medicine and surgery. The students are not allowed to contribute significantly to the patient care during this period. The minimum time required for the undergraduate education is six years. In 1974, 25% of the students were able to graduate after six years; the remaining 75% needed an average of more than seven years.

§ In the third part of the final examination there is, in addition to 240 multiple choice questions which have to be answered in six hours, an oral examination lasting three hours for four students and covering the three subjects attended during the three clerkships. There are no formal evaluation procedures for clerkship performance or for the bedside part of the exam. The students often refuse to be assessed on their performance in the laboratory courses or the bedside teaching sessions. As the ratio is four to eight students to one patient, and the total time is, on the average, 24 hours per subject, ranging from 12 to 48 hours, the reliability and significance of any evaluation would be low. The curriculum recently recommended by the Central Office for the Allocation of Places in Higher Education provides bedside teaching for the first three years of clinical education mainly as a demonstration. Every student gets the equivalent of 78.6 hours of contact with one patient during the first five years of his medical education. In addition to

the seven months per year of university education the students have to spend two months of their three years at the university in the private office of a practicing physician or in an office for public health or industrial health.

§ The institutional goals given in the new regulations are stated as follows: "The universities provide the education to acquire the knowledge and skills needed to pass the examination as defined in these regulations." An official list of the subjects for the multiple choice type examinations, filling four volumes, has been published anonymously by the central office for medical examination. They include only such subjects in which achievement can be evaluated by multiple choice questions. An overwhelmingly didactic approach to medical education is being made, although the new regulations state that the education should be oriented more toward medical practice. In reality, the learning of the students is directed more toward the examination than toward acquiring the skills needed for the practice of medicine itself. The students mainly receive the same effective demonstration teaching in the lecture hall as described by Flexner in 1925. This explains how a large number of students can be trained by a relatively small number of teachers having only a restricted access to patients. In a typical German medical school, the number of students and the number of beds are approximately equal. In the spring of 1977, the Science Council (*Wissenschaftsrat*) published new recommendations for the development of medicine. A minimum number of 0.8 beds per medical student is regarded as sufficient. At present the overall average in the United States is more than 9 beds for each such student in the university hospitals. The regulations went into effect in 1972. The first students have started on their final year consisting of eleven months of clerkship. A much larger number began their clerkship year in autumn 1977. As the first group will then still stay on, not enough places outside of university hospitals have been provided to accommodate all students in their practical year, though this problem has been discussed publicly since 1966. Although the new curriculum introduced new subjects into medical education, like psychology and social medicine, and improved the examination methods, it cannot yet be regarded as a success (Schaefer).

Development of Selection Procedures in West Germany

During the first year after the war the admission procedures helped to distribute the ex-soldiers among the universities rather than to select those qualified for medical education. The admission committees of the faculties based their decisions on the acceptability of war-time examinations, on grade-point averages, and on interviews. From 1950 to 1960, it was no problem to admit all applicants though their number increased from a minimum of 1,500 students entering medical education in 1950 to a first peak of 6,600 in 1962. In 1960, 11 of the then existing 18 medical schools offered unlimited access to the 1,400 places per semester; 7 medical schools, offering 800 places, had introduced a selected procedure. Due to the low birthrate during the war the number of entrants decreased over the next five years to approximately 4,500. Universities tried and managed to keep admissions at a level below 5,000 between 1963 and 1970. From 1963 onward, they used different means for selecting their students. Some of the criteria were not accepted by the ministers or by courts, where some of those turned down brought action against the universities.

In 1964 a central registration office for applicants to medical education was instituted at the University of Bonn by the associated medical faculties. The decision still rested with the universities but their administrative work load was reduced. The total costs of the central registration office were then estimated to rise not higher than DM 30,000. In 1967, the work was continued on a larger scale in Hamburg and was taken over by the Central Office for the Allocation of Places in Higher Education in 1973. At this period the total number of applicants exceeded the number of admissions. In 1965, the assembly of ministers of education requested the universities to admit students exclusively from the waiting list which was expected to grow excessively in winter 1966. In this particular year, two classes were to graduate from *Gymnasium* and enter university due to a shift in the school year. At their meeting in 1966, the medical faculties insisted on adhering to their former way of selection by aptitude and achievement, but, after long discussion, representatives

of the ministries and of the medical faculties compromised provisionally on a procedure selecting 60% of the applicants coming directly from secondary education by achievement grades, and 40% from the waiting list of 2,000 that already existed (*Westdeutscher*). This compromise was later incorporated in the state treaty of 1972; it is still effective and, through the new legislation, may remain so for many years to come.

In 1966, different bonuses were given for residents, national service in the army, evening school graduates, nursing, etc. The universities not only had different cutoff scores, but weighting the grades differently resulted in different grade-point averages (*Westdeutscher*). This led to an increase in actions in the courts and culminated in a decision of the Supreme Constitutional Court on July 18, 1972, called the *Numerus Clausus Urteil.* The right to choose freely the profession and the place of training, based on Article 12 of the Constitution, and the principle of equal rights laid down in Article 3, guarantee that admission to university can only be restricted if society is not able to provide places to accommodate all applicants at the universities.

This led to the state treaty of 1972 for joint action by all *Länder* to regulate admission to tertiary education, followed in 1973 by legislation and the foundation of the Central Office for the Allocation of Places in Higher Education (ZVS) at Dortmund for all *Länder.* As the law requires a uniform measure of the capacity of all universities, an agreement was reached in 1974 for new acts by the *Länder* parliaments, regulating the ratio of staff, space, and resources to the number of students for all disciplines.

The central office for the allocation of study places cannot immediately fill all places at all universities. The Constitutional Court therefore decided in 1975 that any vacancy left at any university after the central allocation procedure has been carried through can be filled by a student who applies for it, irrespective of his status at the central allocation office, provided he has a valid entrance qualification from secondary education.

This resulted in an increase of court actions. In winter 1975/76, 1,200 students took their applications for university admission to court, approximately one third with success. A great number of cases are still pending in the Federal Constitutional

Court concerning the recognition of advanced standing for students changing their subjects or other details of the admission procedure. In a first decision of October 14, 1976, the Court decided in favor of the students. Further decisions were made in February 1977.

This legislation excluded the universities completely from the selection of German students. Most of the medical faculties, overburdened with an increased number of students and a new curriculum, therefore dissolved their admission committees. According to the present legislation, grade-point averages can be compared only via the computer of the central allocation office. The selection process, therefore, is more concerned with the legal aspects than with its scientific validity. The discussion about the admission process takes place in courts, in television broadcasting, newspapers, or in the offices of lawyers. Universities no longer take a very active part in the discussion.

The deficiency of the present system which works only on grade-point averages and waiting time has become obvious to everyone. The goal of the politicians proclaiming free access to medical education, which was excellently expressed by the President of the Federal Republic (Reumann), may only be reached by the end of the century. The new skeleton law for higher education which came into effect in 1976 therefore demands a new selection procedure for those subjects in which the number of applicants exceeds the available places at the universities, thus leading to excessively high qualification standards and extremely long waiting lists.

Present Selection Procedure

According to the State Treaty of 1972, the Central Office has to control at a federal level the admission of students to education in those subjects where the expected total number of applicants exceeds the number of vacancies available in the whole Federal Republic for first-year students. Other subjects can be included on the request of a *Land*. Universities cannot apply to, or negotiate with, the Central Office. At present a total of 42 subjects are under control of the Central Office. Of these, only 25 subjects are requested by all of the *Länder*. For the summer

semester 1976, the central selection included only 16 subjects for all of the universities; for the other subjects, only a distribution of the applicants to the different universities was necessary. The board of governors of the Central Allocation Office, consisting of one civil servant from the government of each *Land*, and one advisor from the universities of each *Land*, decided in September 1976 to reduce the number of subjects for the Central Office to 15, including, among others, medicine, dentistry, pharmacy, veterinary medicine, psychology, biology, and biochemistry.

Each *Land* reports to the Central Office the number of vacancies at its universities. They are uniformly calculated by formulas from factors for staff, space, resources, patients, and 14 categories of teaching as needed for the curricula in accordance with the law of 1974.

From this total figure of vacancies, up to 8% are allotted to foreign students, up to 15% to cases of special hardship, and 2% each to the medical staff of the armed forces, the government, and local administrations. Preference is furthermore given to those who would have been admitted before or during their national service in the army, or as conscientious objectors.

Of the remaining places, 60% are allotted to applicants qualified by aptitude and achievement, 40% being reserved for those ranking first on the waiting list. All applicants not belonging to one of the preferred groups are ranked in two lists according to the following factors: grade-point average, year of acquisition of the right for tertiary education, and national service. Within each subgroup the ranking takes place by lottery. In one list the decisive factor is the grade-point average, in the other the year when the qualification for tertiary education was obtained. The grade-point average is adjusted according to the difference between the average of the *Land* and the overall average for West Germany, worked out for each year separately. A special bonus of 0.5 points on a scale of 6 points is given to those graduating from night grammar schools. Applicants coming from one special experimental school gain 0.3 points; minority students from French- or Danish-speaking schools 0.1 point.

The students are then selected by their rank, 60% taken from the list ranked according to aptitude and achievement and 40% from the list ranked according to the year of acquisition of the right to study at a university. Applicants whose *Abitur* dates back more than eight years are excluded; exceptions can be granted after an appeal to the university. Otherwise, the universities deal only with foreign applicants and assess the severity in cases of special hardship. The universities have to report the enrollment of the selected students to the central office, as a second or third selection is carried out immediately to fill in the places not accepted by the students in the first run.

For those subjects in which the total number of applicants does not exceed the total capacities of all universities, the Central Office is only to distribute them according to the preference stated by the students and to social circumstances.

The selection and distribution is determined by a computer; the total staff of the Dortmund office now exceeds 260. In order to give students the information and instruction needed for the application a booklet of more than 100 pages, folio format, is distributed free.

Results

The Central Office must cope with an increasing number of applications. For the winter semester 1976/77, 171,000 students applied for admission to a university education; 29,000 for admission to medicine. Altogether, 80,000 students could be accommodated at the universities, more than 5,000 of them in medicine. Statistics for summer 1974 serve to illustrate the result of the selection process of 34.444 German applicants. 17,890, or 52%, gave medicine as their first choice, applying for 2,614 vacant places. 2,981 of the 3,193 to whom a place was offered could be enrolled at the universities together with 212 foreign students. Altogether, 3,193 students could be enrolled though only 2,614 vacant places had been reported. The figures for 1973-1976 for applicants for medicine and the number of vacancies are given in Table 3. For 1974, 7,259 vacant places were reported. Students admitted in 1974 could take their preclinical examination in 1976. In that year the central examination

TABLE 3

Number of German Applicants and Places Available for Medical Education at all German Universities 1973-76

Semester	Number of Applicants	Places Available for		Applicant/ Places Ratio
		German	All Students	
Winter 73/74	21,794	4,037	4,383	5.4
Summer 74	15,822	2,614	2,842	6.1
Winter 74/75	23,381	4,064	4,417	5.8
Summer 75	19,682	2,758	2,998	6.9
Winter 75/76	28,162	4,306	4,684	6.5
Summer 76	25,054	2,858	3,977	8.4
Winter 76/77	30,519	5,032	5,468	5.8

office reported that 7,433 of the 8,369 students sitting for the examination had passed successfully. It is obvious that more students actually entered medical education than the vacancies reported.

From figures collected by the Central Office for the Allocation of Study Places in the summer semesters 1972 and 1974, it was possible to calculate the percentages of students admitted to medical education as related to their respective waiting times since the year of qualification for higher education (*Zentralstelle* 1974). These figures, together with those indicating the application/enrollment ratio for 1974 are given in Table 4. Less than 45% of the admitted students qualified in the preceding year. There is a steep decrease to 12% having qualified two years before admission, and to 5% of those having waited since 1967. The next column reveals that there is a remarkable improvement in chances for a successful application, to more than 90%, for those having waited for six to eight years. At the same time the academic qualification needed to be admitted to medical education is considerably lowered. This is shown in the last column for those 3,299 students applying in March 1976 for the preclinical exam. The preceding column shows an almost identical distribution for their year of qualification for higher education among the candidates applying for their first examination in

TABLE 4

Year of Qualification for University Education and Enrollment/Application Ratio for Medical Students Enrolled in Summers 1972 and 1974

Year of Qualification	% of 2,398 Students Enrolled in 1972	% of 2,981 Students Enrolled in 1974	Enrollment/ Application Ratio for 1974	% of 3,299 Students Applying for Preclin. Exam March 1976	
				%	GPA
1974		0.7	0.512	0.5	2.0
1973		44.6	0.195	45.6	2.0
1972	3.4	12.7	0.081	14.5	2.5
1971	42.1	7.0	0.066	10.5	2.8
1970	12.8	6.4	0.096	8.7	2.9
1969	13.5	12.2	0.690	9.3	3.1
1968	13.2	6.0	0.940	4.6	2.9
1967	15.0*	3.8	0.970	2.4	3.0
1966		5.0	0.940	2.5	3.0
before 1966		1.6	0.167	1.6	2.9
	100.0%	100.0%		100.2%	

*Including the previous years.

March 1976. Those qualifying in 1969 or earlier are underrepresented in the examination of 1976; they represent 28.6% at the time of admission but only 20.4% in the examination.

The cutoff scores required for a successful application have been published. The figures since the first year of operation of the central office for applicants from both lists. ranked either by academic achievement or by waiting time, are listed on Table 5.

The school leaving certificate necessary for the application is granted by the *Gymnasium* late in June. The deadline for the application is July 15 for the winter semester, and January 15 for the summer semester. The grade-point average required for entering medical education at the earliest possible date, namely in the winter semester following the graduation in summer, is as

TABLE 5
Cutoff Score and Year of Qualification of Medical Students Selected from the Aptitude and Achievement List and from the Waiting List

Semester	Achievement List		Waiting List	
	Year of Qual.	GPA	Year of Qual.	GPA
Winter 73/74	73	1.9	69	3.5
Summer 74	73	2.0	69	3.6
Winter 75/76	74	1.6	70	3.1
Summer 76	75	1.7	70	3.2
Winter 76/77	76	1.6	70	3.8

German School Grades:
Pass: 1 (outstanding) to 4 (fair average)
Fail: 5 (poor) and 6 (insufficient)

high as 1.6, and it is only little lower for the next summer semester. Recently, admission conditions have become still more exclusive, the required GPA rising from 1.9 in 1973 to 1.6 in 1976. For applicants who were in a position to endure longer waiting times the requirements were less exacting. After six years of waiting the cutoff score is now 3.8. The German school grades are: 1—outstanding; 2—very good; 3—high average; 4—fair average; 5—poor; 6—insufficient. For passing, grade 4 or better is needed.

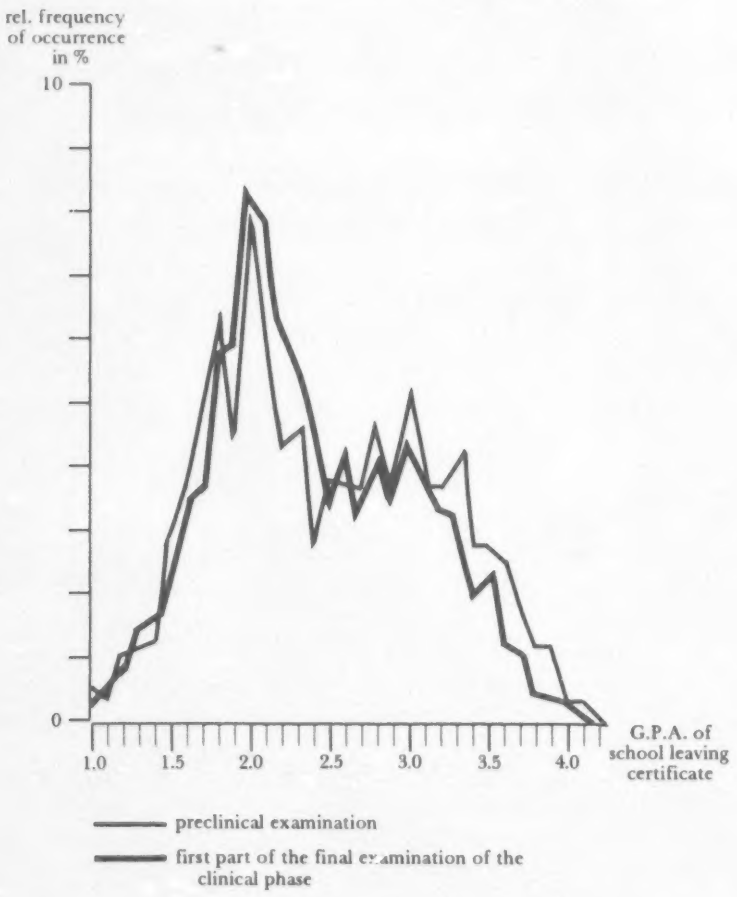
In a representative sample of final year German high school students in 1973/74 a mean GPA of 2.88 ± 0.87 was worked out. This would give a range of 2.0 to 3.7 for students being within plus or minus 1 standard deviation, comprising 68.2% of all students.

The distribution of the raw grade-point averages for the 34,000 applicants at the central office for higher education has been published for summer 1974. Only 5.4% had a grade point average of 2.0 or higher, and 11.1% of 3.7 or higher. Hence, 5.4% of all students qualified for tertiary education could have been admitted to medical education immediately, and 89% after six years of waiting. In 1974, only 1.3% of the applicants had a grade-point average of 1.6, entitling them to an immediate admission according to the standards of 1976; after six years of

waiting, however, the chances would be that 93.4% of this group would be admitted to medical education. From the figures collected by the central examination office the distribution of the GPA of 3,299 students taking the first and 2 nts taking the second examination in spring 1976 could be worked out. It is given in Table 6.

TABLE 6

Distribution of Grade Point Averages of Medical Students Taking their First and Second Medical Exam in Spring 1976



Waiting Time

The selection of medical students by their capacity to endure on the waiting list is a special feature developed in Germany more than ten years ago. In 1974 students admitted to medical education had to wait for an average of 2.7 years after the completion of their secondary education. A few investigations of the resulting behavior have been published. They reveal that the majority of students persist in their intention to study medicine. Analyzing data gained from questionnaires sent out to 6,889 students who applied between 1967 and 1969/70, Bochnik, Donike, and Dittrich found out that 60% of the students persisted in applying for medicine for up to three years. They were encouraged by an increase in their chances after a waiting time of six years or longer, as shown on Table 4. Only 5-10% turned to a career without a university education, only 1% to an allied health profession. The decisions of those who stopped applying for medical education are given on Table 7, together with the proportion of time spent on different subjects while waiting for an admission to medicine.

Further results were: the percentage of applicants whose parents were in the medical profession increased from 30% filing their first application to 36% staying on in the waiting list. The percentage of female applicants diminished from 29.4% to 22% in the waiting list. The percentage of applicants whose parents were manual laborers was reduced from 5.8 to 3.2. This reduction occurs only after the first refusal; it is statistically significant.

The authors therefore reach the conclusion that the waiting list system favors applicants from the upper social class and, where medicine is concerned, the children of parents already in the medical profession. It leads to an overall prolongation of university education with a corresponding increase of expenditure, and to a reduction of the free access to university in many other subjects. It does, therefore, not help to reduce social inequalities. If the number of applicants on the waiting list and the period allowed to stay on the waiting list are not limited, the chances to enter university for those having lower grades are not improved. No prediction of the final outcome of an individual

application can be made as it depends on the unpredictable decisions of a great number of applicants and students. In a pilot study analyzing their data from testing 112 students for counselling between 1969 and 1972, Schott and Schott concluded that medical students admitted from the waiting list are more interested in the psychosocial aspects of medicine; they are more oriented toward family medicine, internal medicine, and psychiatry. They have a higher tolerance for ambiguity. Those selected from the achievement list are more interested in research and hospital careers (Schott).

With thousands of students waiting for admission to medical education, for many years to come, the so-called "parking study"* became a menace to all vocational training related to medicine, leading primarily to a competitive inhibition. As all replacement subjects are abandoned as soon as a place in medicine is offered, this could have led to a deficit of trainees, e.g., in nursing or laboratory technicians. Therefore, the regulations of the skeleton law for higher education of 1976 provide that the time spent in parking studies has to be deducted from the time effective for the ranking in the waiting list. The Constitutional Court has ruled that this can be applied only to students having entered the university after December 1974. The consequences of this judgment cannot be foreseen as the number of students to whom it applies is unknown. It is questionable whether the increase in justice, equality, and clarity in the selection process, intended by the Constitutional Court in 1972, was attained but the new federal law introduces new methods for the selection of students which could not be developed by the universities alone. By a pooling of funds through the government, it was possible to start their development on a sound scientific basis after investigations covering wide areas of the world.

*"Parking study" refers to the enrollment by a student denied immediate entry to the subject of his choice in another "replacement" related field less difficult to be admitted to for the period until, through the operation of the waiting period, he is admitted to his first choice subject.

TABLE 7

Career Decisions of Applicants for Medical Education after Abandoning Medicine (A), or when Taking Up a "Parking Study" (B)*

Subjects	(A)	(B)
	%	%
Science	29.5	42.7
Law	17.0	2.9
Education	8.9	1.9
Economy and Social Sciences	8.5	1.9
Psychology	8.1	2.8
Arts	7.7	2.2
Other Subjects	7.4	1.8
Veterinary Medicine	4.3	4.8
No Tertiary Education	8.6	
Training Outside of University		10.1
National Service		23.6
Without Occupation	5.2	
	106.9%	100.0%

*Column (A) lists percentages of a number of 258 former applicants for medicine; column (B) lists percentages of a total number of semesters spent on a "parking study" by 2,599 applicants.

New Developments in Accordance with Federal Legislation for Higher Education

If this general selection procedure should lead to unwarrantably high entrance qualifications or to an unduly long waiting time for many of the applicants, a special selection procedure takes place. The results of a special assessment of the applicant's aptitude have to be added to the grade point average; 5-10% of all students admitted may even be selected solely by this second assessment of aptitude. In this procedure, capabilities and achievements, not included in the school leaving certificate, but of importance for the intended study course are to be assessed. All the assessment methods have to be uniform for all *Länder* of the Federal Republic and have to be carried out at state institu-

tions. As long as the criteria for the school leaving certificate are not uniform, quotas for each *Land* must be adjusted to the proportion of applicants in the age group. The result of the special assessment is valid for only one year, and repetition may be possible. Privileged applicants also have to take tests but their quota is not to exceed 30%.

An increase in the intake of the medical schools seems to be justified by the increase in resources over the last years, resulting in the dissolution of the waiting queue, which consists presently of approximately 40,000 applicants. It is not to be expected that the ratio of applicants to the capacity of the university falls below two, or even three to one. New additional selection procedures based on the assessment of the applicant's capacity to conclude successfully the medical education are therefore needed. They must leave a certain chance to every applicant, independent of his school grades, though in reality for a given individual the probability to gain access to medical education may be low. These assessment methods have to be plausible, feasible, scientifically reasonable, and they must be acceptable to applicants, to the public, and to the faculties.

The major method already under development will be a test for aptitudes and skills needed for education in medicine. It is assumed that the objectives of the medical curriculum reflect the qualifications needed for the medical profession. Should it be possible to develop and implement interview techniques with a satisfactory standardization, an interview may be used to select a certain proportion from about twice the number of those that are ranked highest by grade-point average and test. It is to be regretted that the cooperation of those concerned at the universities is so limited (Böning). For the medical faculties, this can be explained by their workload of patient care, research, and teaching. A great number of psychologists object, for scientific or ethical reasons, to tests being used for a decision over the fate of a great number of juveniles, which is justified only by political reasons.

Fortunately, it has been possible for the Federal Ministry of Education and Science to employ three teams of psychologists to develop the methods needed for the assessment of applicants

for an education in medicine and dentistry. Professor Michel from the University of Mannheim, whose group's experience in the selection of students earned a national award, is developing such a test. Because of political and ethical reasons the test will not include personality factors, although these could be expected to improve the validity of the test battery. Hence, the test will concentrate on the following abilities: general intelligence, memory (verbal and nonverbal material), visual perception, spatial visualization, psychomotor coordination, comprehension in the field of science, and working habits.

The first trial using 200 high school students was carried out in 1976. It is expected that this test will be available for use for the admission of students in summer 1979 as demanded by the skeleton law. An interim solution may be used in 1978. A committee of medical advisors has been nominated by the Federal Ministry.

The major objective of the German system—to admit students to the higher education of their choice, irrespective of their academic standing in secondary education—has been achieved. The German aim to let students enjoy a long, liberal education, not entirely devoted to vocational training, has also been attained. The prolongation of the university education resulting from a mean waiting time of more than two years is also in accordance with the German constitution regarding free access to education as a human right. It could be tolerated in a flourishing economic situation, and restrictions have only recently had to be introduced. Through great efforts an increase in admissions to all forms of higher education has been accomplished.

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ITALY

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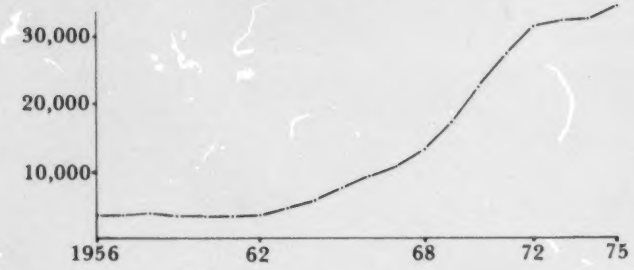
I WOULD like to preface my remarks by saying that to present a report to a Conference on Access to Medical Education puts me in a slightly embarrassing position insofar as I represent, I believe, the only country in the world in which the limitation and selection of applicants for admission to medical school, though strongly desired by many and certainly called for by the present situation, has never been transformed into a reality. Our politicians fear losing the easy backing obtained by following an open admission policy. Italy, in 1969, abolished the only restriction placed on admission—possession of a diploma from a "classical" or "scientific" high school.[1]

Practicing physicians in Italy number 147,013 in 1977; the number of students in medical school is 156,998. Thus the number of inhabitants per physician could conceivably go down to 290-310 by 1980. In the 1976-77 academic year, 237,421 (77%) of the 308,338 1976 high school graduates enrolled in college. Out of a population of 56,324,727, there are presently 746,323 college students, 21% of whom are enrolled in medical schools. The inevitable result of this situation is that the graduates are facing a serious crisis. In January 1976, 105,000 college graduates under 30 (including 42,000 women) were unemployed, compared to a total of 1,200,000 unemployed (760,000 women) in the same age group. Of the 105,000 unemployed college graduates, only 3,000 are physicians, compared to the 50,000 with degrees in letters, philosophy, and education; 29,000 with degrees in law or political science, and 9,000 with degrees in the biological sciences. Nonetheless, the rapid in-

Figure 1
Total Enrollment, Italian Medical Schools



crease in enrollment in medical school will doubtless lead to considerable unemployment, or underemployment, even in this hitherto relatively unaffected field.

Medical School Enrollments

Table 1 illustrates the trend of medical schools in Italy over the last 20 years. Until 1962-63, the number of students enrolled in medical schools remained fairly constant: 25-26,000 total enrollment, with 3,300-3,600 new freshmen each year. These figures began to increase after 1962 for the following reasons:

1. The postwar baby boom;
2. The precollege school population was increasing, producing a

Figure 2
Enrollment of Freshmen, Italian Medical Schools

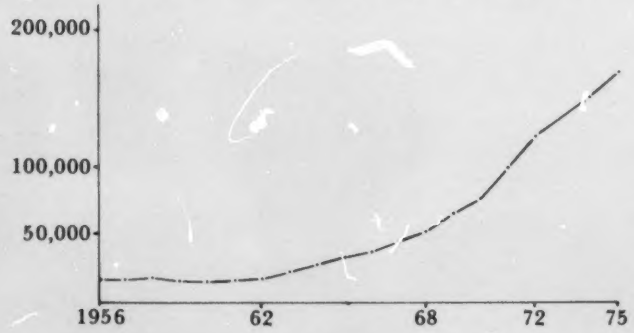


TABLE 1

Total Enrollments, Freshmen, and Graduates of Italian Medical Schools: 1956-57 to 1976-77

	Students Enrolled						Freshmen			Graduates	
	On Sched. No.	Behind		Total No.	% of all University Students	(1)	No.	% of all University Students	(2)	No.	% of all University Students
		No.	%								
1956-57	17,609	8,874	33.2	26,393	12.4	104	3,374	7.6	102	3,081	15.1
1957-58	17,960	7,787	30.2	25,747	11.7	102	3,516	7.2	105	3,079	14.9
1958-59	18,192	7,177	28.2	25,369	11.0	101	3,705	7.4	112	2,767	13.2
1959-60	18,187	7,493	29.1	25,630	10.4	102	3,353	5.9	101	2,710	12.8
1960-61	17,915	7,053	28.2	24,968	9.3	99	3,218	5.4	97	2,559	11.6
1961-62	17,965	7,200	28.6	25,165	8.7	100	3,308	5.1	100	2,604	11.3
1962-63	18,394	7,336	28.5	25,730	8.2	102	3,650	4.9	110	2,559	10.6
1963-64	19,263	6,459	25.1	25,722	7.7	102	4,135	5.3	125	2,761	10.5
1964-65	21,174	6,956	24.7	28,130	7.8	112	5,45[illegible]	6.3	165	2,857	10.8
1965-66	25,074	6,681	21.0	31,755	7.8	126	7,4[illegible]1	7.0	223	2,645	9.1
1966-67	30,107	7,030	18.9	37,137	8.1	147	8,9[illegible]3	7.5	271	2,702	8.6
1967-68	36,037	7,717	17.6	43,754	8.7	174	10,578	8.3	319	3,202	7.9
1968-69	44,127	7,19[illegible]	14.0	51,322	9.3	204	13,017	9.1	393	3,350	7.0
1969-70	58,800	5,20[illegible]	8.1	64,002	10.4	254	16,687	9.5	504	4,028	7.1
1970-71	70,609	4,1[illegible]2	5.6	74,79[illegible]	11.6	297	22,356	11.5	675	4,864	8.0
1971-72	92,865	5,282	5.4	98,1[illegible]7	12.9	390	27,491	12.8	831	5,411	8.4
1972-73	113,823	7,949	6.5	121,772	15.2	483	30,806	14.1	931	6,001	4.3
1973-74	124,220	12,911	9.4	137,131	20.3	544	29,131	13.6	880	6,601	10.2
1974-75	135,884	14,311	9.5	150,195	21.2	599	29,325	12.6	884	8,590	12.0
1975-76	151,688	16,756	9.9	168,444	22.8	669	33,354	13.7	1008	–	–
1976-77	156,998	–	–	–	–	–	–	–	–	–	–

(1) Index value given total enrollment in 1961-62 = 100.
(2) Index value given total number of freshmen in 1961-62 = 100.

Source: ISTAT, Annuario statistico italiano, 1958-73. Monthly statistical bulletin, 1971-77.

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larger number of high school graduates and thereby a larger number of students eligible for admission to medical school;

3. The economic level of a large number of families was increasing, due to the "Italian economic miracle" of the 1960s, and the prospects of high earnings in a medical career led to a preference for this profession.

In the six years between 1962-63 and 1968-69, total enrollment in medical schools doubled to 51,322, but the number of freshmen grew four-fold, to 13,017.[2]

The real flood of enrollments came in the 1969-70 academic year, following passage on December 11, 1969 of Law 910, entitled "Urgent Measures for the University." This law establishes that:

§ Access to all schools of the university is open to all graduates of five-year high schools. This means that the medical schools, in particular, are open not only to graduates of the "classical" and "scientific" high schools, but also to graduates of the various four-year vocational, artistic, and elementary teachers' schools who are required to take a one-year college preparatory course. All these students are automatically admitted to the university upon presentation of their high school diploma and payment of the university fees, without any sort of selective examination.

§ A student enrolled in a particular degree course may either follow the traditional study plan or design one of his own. He may include, if he wishes, courses from different schools within the university, providing that the number of courses taken is not less than that officially required and that the personalized plan is approved by the faculty committee. The traditional "blocks" of courses for second and fourth year medical students, the satisfactory completion of which was a prerequisite for admission into third- and fifth-year courses, were thus dissolved, thereby permitting those who previously were considered behind in their exams to advance regularly from one year to the next.

These seemingly illogical measures were supposed to be followed by a true, extensive reform of the university structure, with the creation of departments, selective requirements, research doctorates, and so forth. Meanwhile, the effects of these

TABLE 2

Total Enrollments, Freshmen, and Graduates of the University of Milan Medical School
1956-57 to 1976-77

Academic Year	On Sched. No.	Students Enrolled: Behind No.	Behind %	Total Enrolled No.	Total Enrolled (1)	Freshmen No.	Freshmen (2)	Grad's No.
1956-57	1,475	773	34.4	2,248	120	338	129	266
1957-58	1,549	616	28.4	2,165	116	353	136	226
1958-59	1,617	528	24.6	2,145	115	347	132	249
1959-60	1,581	507	24.3	2,088	112	345	132	203
1960-61	1,502	496	24.8	1,998	107	293	112	201
1961-62	1,441	427	22.8	1,868	100	262	100	234
1962-63	1,419	424	23.0	1,843	99	331	126	194
1963-64	1,475	375	20.3	1,850	99	368	140	202
1964-65	1,546	391	20.2	1,937	104	432	165	204
1965-66	1,797	396	18.0	2,193	117	574	219	171
1966-67	2,227	383	14.7	2,610	140	729	278	164
1967-68	2,486	431	14.8	2,917	156	768	293	209
1968-69	2,975	369	11.0	3,344	179	849	324	214
1969-70	3,849	271	6.6	4,120	220	1,147	438	294
1970-71	5,260	114	2.1	5,374	288	1,732	661	338
1971-72	6,897	170	2.4	7,067	378	2,131	813	483
1972-73	8,899	285	3.1	9,184	492	2,881	1,099	619
1973-74	11,117	626	5.3	11,743	628	2,801	1,069	705
1974-75	12,940	1,103	8.0	14,043	751	2,750	1,049	881
1975-76	14,520	1,387	9.5	15,907	851	3,182	1,214	1,026
1976-77	14,984	1,104	7.4	16,088	861	2,844	1,085	–

(1) Index value given total enrollment in 1961-62 = 100.
(2) Index value given total number of freshmen in 1961-62 = 100.

Data furnished by the University of Milan Medical School.

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first measures were as follows: From 1968-69 to 1972-73, the number of medical school freshmen went from 13,017 to 30,806, and in 1975-76 they numbered 33,354. Total medical school enrollment was 51,322 in 1968-69, 121,772 in 1972-73, and 168,444 in 1975-76.

While the number of students who had fallen behind their course schedule was 30-35% of the total enrollment from 1955 to 1957, after enactment of Law 910 the number became virtually nil, not because students suddenly became more diligent, but because of the abolition of the traditional blocks of courses as prerequisites for passage from one year to the next.

This situation was further complicated by other provisions of Law 910 which substituted for tenured teaching assistantships fellowships and contracts having a two- or four-year limit. This precluded for the assignees the possibility of pursuing a university career, and professorships; the former annual designations were replaced by a single designation made in 1974.

The economic crisis that developed in the period immediately following enactment of Law 910 prevented the realization of the planned university reform; consequently, although the number of students enrolled in medical schools is now 156,998, according to data of the Central Statistics Institute, university structures and teaching facilities are still those of the 1960s.

Table 2 concerns the Medical School of the University of Milan, of which I am a faculty member. The data are quite in line with the national trend. Substituting the total number of students and of freshmen in 1961-62 with the number 100, the respective figures for the 1975-76 academic year would be 851 and 1214. In that year, the number of freshmen enrolled in the University of Milan Medical School (3,182)—and the situation is worse in Rome and Naples—was equal to the total number of medical school freshmen in *all of Italy* in 1956-57 (3,374)!

Foreign Students

As a logical consequence of the total absence of selective requirements, an ever-increasing number of foreign students has been coming to Italy after having been refused admission to medical schools in their own and/or other foreign countries.* These students are required only to present a diploma from a

TABLE 3
Foreign Students in Italian Medical Schools

	Academic Year				
	1969-70	1970-71	1971-72	1972-73	1973-74
Foreign Medical Students	4,915	5,897	7,714	9.011	8,605
% of Total Medical Students	7.7	7.9	7.8	7.[illegible]	6.3
Country of Origin:					
U.S.A.	706	739	708	791	881
% of Foreign Medical Students	14.4	12.5	9.2	8.8	10.2
Greece	1,666	2,048	3,385	4,197	3,792
%	33.9	34.7	43.9	46.6	44.1
Israel	885	1,172	1,219	1,259	1,165
%	18.0	19.9	15.8	13.9	13.5
Lebanon	33	29	48	91	122
%	0.7	0.5	0.6	1.0	1.4
Syria	316	503	471	375	425
%	6.4	8.5	6.1	4.2	4.9
Jordan	309	500	860	1,079	836
%	6.3	8.5	11.1	11.9	9.7

Source: Annuario Statistico Italiano, ISTAT 1970-1974; Annuario statistico dell'Istruzione ISTAT, 1970-1973.

five-year high school or its equivalent, and to pass an examination in the Italian language, which, however, is only a formality. (I have personally examined several foreign students, especially from the Middle Eastern countries, who after five years of study in Italy still had a great deal of trouble expressing themselves in Italian.)

The data (Tables 3 and 4) for the Italian medical schools and for Milan's medical school—which, along with those of Bologna and Rome attracts the greatest number of foreign students who transfer there after freshmen year at a school assigned by the Ministry of Education—show a rapid increase in the enrollment of foreign students since 1968-69: 75% for all schools, but an amazing 836% for Milan's medical school! Due to a simultaneous increase in enrollment of Italian students, the percentage of foreign students remains in Italy between 8 and 6% but has increased from 2.7 to 6.5% in Milan. The largest group of foreign students comes from Greece, followed by Israel and U.S. North American participation is poor in Milan, where Middle Eastern students are now 29.3% of the foreign students (only 16.0% in Italy).

These students, after graduation, rarely stay to practice medicine in Italy. Moreover, their academic level is generally lower than average, so that their presence in Italian medical schools, far from bringing such schools up to an international level, only puts an added strain on the already overly taxed system.

Premedical Education

Premedical education in Italy is the task of the high schools, which students attend after five years of elementary school and three years of junior high school. The high schools generally have five-year programs. High schools in Italy are of different types: the "classical" high schools emphasize the humanities—history, philosophy, and classical languages, with secondary, but growing emphasis on the mathematical and biological sciences. The "scientific" high schools devote most of their program to the natural sciences and modern languages. Then there are the vocational schools, which offer job-oriented programs in the fields of industry, business, agriculture, construction, tourism, fine arts, and elementary school teaching.

TABLE 4

Foreign Students in the University of Milan Medical School

	Academic Year						
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
Foreign Medical Students	111	146	112	291	557	742	1,039
% of Total Med. Students	2.69	2.71	1.58	3.16	4.74	5.28	6.53
Foreign Med School Grads.	8	9	9	21	26	37	50
% of Total Med School Grads.	2.72	2.66	1.86	3.39	3.69	4.20	4.87
Country of Origin:							
U.S.A.	5	4	3	4	13	7	11
% of Foreign Med. Students	4.50	2.74	2.68	1.37	2.33	0.94	1.06
Greece	12	11	not	37	93	178	312
%	10.81	7.53	available	12.71	16.69	23.99	30.03
Israel	56	74	68	82	122	156	182
%	50.45	50.68	60.71	28.18	21.90	21.02	17.52
Lebanon	1	1	2	20	29	35	49
%	0.90	0.68	1.78	6.87	5.21	4.72	4.72
Syria	2	4	2	12	69	82	84
%	1.80	2.74	1.78	4.12	12.39	11.05	8.08
Jordan	0	0	1	6	38	95	172
%	–	–	0.89	2.06	6.82	12.80	16.55

Data furnished by the University of Milan Medical School.

In order to be admitted to the university, students must present an acceptable diploma and pay a very modest fee ($100-150 a year) from which they may be exempted if their family's annual income is under $3,000. In this case, students are also eligible for state aid in the form of what are referred to as "presalary" payments, amounting to $1,000 a year.

Students possess vastly varying backgrounds, and often lack the biological and mathematical basic studies that are indispensable for successful advancement in medical school. The need to institute some form of selection and of limiting admissions is now receiving wide acceptance, even on the part of those political parties which had always opposed a selection as leading inevitably to discrimination against the less economically and culturally advantaged classes.

Desirable Revisions in the Selection Process

The schools of medicine, dentistry and the health sciences would be completely restructured. The law envisions a two-year preparatory course in the medical sciences, to be offered by the School of Medicine. Admission to this course is open to all high school graduates without entrance examinations or *numerus clausus*. Students who pass the final examination at the end of the course are awarded a "Diploma in Medical Science;" holders of this diploma may apply to one of four degree programs: Medicine (four years), Dentistry (three years), Health and Laboratory Technology (three years), and Health Administration and Nursing (two years). While admission to the last two programs will not be limited, the number of students to be admitted to the Medicine and Dentistry degree programs will be set each year by the Ministry of Public Education in conjunction with the Ministry of Health, taking into account the needs expressed by the health authorities of the individual Italian Regions. There is no mention in the proposed law of an assessment of the teaching facilities available in the individual medical schools for the purpose of assigning an optimum number of students to each; but it is our hope that this "detail" will not be neglected, and that the sore overcrowding of our medical schools may thus be remedied.

Nor does the proposed law indicate what criteria are to be used in evaluating applications for admission to the Schools of Medicine and Dentistry. Article 14 states only that applicants are to be judged on the basis of the final grade received in the course leading to the Diploma in Medical Science. However, since this grade takes into account both the grades received in the various subjects taken during the two-year course, and that given for a practical examination (a maximum of 70 points may be awarded for the grades and 30 for the practical exam), it is clear that the criteria will have to be more precisely defined in order to choose between those having the same final grades, especially when coming from different schools.

Conclusions

The introduction of a limited admissions policy in the Italian university, or at any rate in the university medical schools, will encounter a great deal of political opposition, as the trend of the past years has been one of ever-growing permissiveness and gradual abdication of responsibility. Nonetheless, even the political groups to the left are taking a stand in favor of the reform; they speak not of "closed number" but of "programmed number," underlining the need for programming the number of future doctors rather than that of selecting applicants on the basis of their level of preparation. The difference, however, is minimal.

From a qualitative standpoint, the role and professional training of physicians must be seriously reconsidered in view of the changing health picture of the country, the progress of medical science, and the upsurgence of preventive medicine as the only instrument capable of combatting the incidence of chronic, degenerative diseases.

From a quantitative standpoint, the boom in enrollment in medical schools has made the already overloaded facilities and teaching staff absolutely incapable of meeting the need. The number of medical students has increased six-fold in the last decade; the average number of students per medical school has gone from 805 in 1961-62 to 5,102 in 1974-75; the number of students per teacher has gone from 30.6 in 1966-67 to the present 73, whereas the optimum would be 20; the ratio of students

to hospital beds has reached 1:1.2, against an optimal ratio of 1:6; and the number of graduates is so high that by 1980 there will be one doctor for every 290-310 inhabitants, compared to the much more reasonable ratios to be found in countries with a rational development of health services (see Table 5). Finally, the ratio of doctors to nurses, which is 1:3 or 1:4 in Scandinavia, Great Britain and the United States, is 1:1.2 in Italy.

TABLE 5

Estimates of the Number of M.D.s in Various Countries for the year 1980

Country	No. of Inhabitants per M.D.
Great Britain	629
Sweden	500
USSR	476
France	413-641
Israel	408
Italy	290-310

Courget, J. *L'Hopital aujourd'hui et demain.* Ed. Seuil, 1971, p. 82.

Censis: Quindicinale di note e commenti, *10*, 510, 1974.

The falling academic level, the saturation of the medical job market, the spectre of underemployment or even unemployment for medical school graduates, all point to the urgent necessity of regulating access to medical school. Such regulation would serve the following purposes:

§ to ensure that medical students have adequate background and aptitude;

§ to make quality teaching possible through optimal ratios of teachers, students, and facilities;

§ to supply the quantity of medical personnel that corresponds to the real needs of the country.

A selective limitation of admissions which does not discriminate on cultural or economic bases is now universally accepted

but the problem to be solved will still be that of enforcing the the selective criteria equitably.

FOOTNOTES

1. The only Italian medical school that has followed a policy of limited admissions from its founding to the present is the Catholic University of the Sacred Heart in Rome, a privately run, state-recognized institution. A maximum of 150 freshmen are admitted on the basis of written aptitude tests and personal interviews.
2. In 1962-63, 4.9% of all college freshmen were enrolled in medical school; this percentage rose to 9.1% in 1968-69 and to 14.1% in 1972-73.

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NETHERLANDS

N. H. F. W. Wijnen

THE Netherlands is a very small country. More than 13.5 million people live in an area of about 40,000 square kilometers. It is divided into 11 provinces, but most of the government power is located at the national level. The health care system and the educational system are the same throughout the provinces; in a very small country this seems like a rational way of arranging things.

Traditionally the birthrate has been quite high compared to neighboring countries. Combined with a low infant mortality and a favorable life expectancy, there was a considerable annual population growth. Since 1970, however, the birthrate declined sharply from 16 per 1,000 in 1970 to 13.7 in 1972, and 12.9 in 1976. Meanwhile deaths per year have increased slightly. These changing trends have drastically altered population expectancies for the future: instead of a growing population until 2000, the expectancy now is that by 1985 a maximum population of about 15.5 million will be reached, with a slow decrease expected thereafter.

Health Care System in the Netherlands

The Netherlands does not have an integrated service and public health care system, but rather a mixture of services developed largely through private enterprise. Traditionally the role of the government has been to stimulate these services by direct subsidies, by social and health legislation, and by establishing additional services.

Historically, the general practitioners have held a central position in the health care system of the Netherlands. This position

is reinforced by social insurance and private health insurance regulations, which require in most cases that specialists and hospital treatments can be funded only if treatment is given on the prescription of a general practitioner. Most general practitioners are in private practice with a minority cooperating in group practices and local health centers.

The total number of active physicians is about 22,000 (1976) or 1.59 per 1,000 inhabitants. About 5,000 of these physicians are general practitioners; 7,000 are specialists; the remaining 10,000 work in preventive fields (such as industries, schools, public health services), education, and research. The number of specialists is rising at a higher rate than the number of general practitioners. About 1,000 midwives render obstetrical aid in about 40 percent of the deliveries. There are approximately 1,200 pharmacists in the Netherlands.

Health insurance is provided by government regulation; 9.3 million people are covered by a system of "sickness funds." The basis of this system is the Sickness Funds Law which requires compulsory insurance for wage earners with an annual income under about 34,000 Dutch guilders, special insurance for aged people, and a voluntary insurance for non-wage workers earning less than 34,000 Dutch guilders.

The general practitioners receive a fixed annual fee per insured person. Special fees for hospital treatment and specialist treatment are negotiated on a national level between the sickness funds and the organizations of specialists. The remainder of the population has the option of private health insurance offered by several companies and nonprofit organizations (sometimes linked with sickness funds).

The actual figures on in-patient care are presented in Table 1. Sixteen percent of the hospitals are run by government (mostly local authorities). The other hospitals are under the control of private organizations, often with a religious background.

Preventive health care in the Netherlands is—except in a few large towns—provided mainly by the Cross Association (Green Cross), which is a federation of formerly separate organizations working in the same field. This organization employs about 4,000 district nurses who participate in the baby and toddler's

TABLE 1
Some Quantitative Aspects of the Dutch Health Care System–1975

	Number of Institutions	Number of Beds	Number of Staff Employed
Hospitals (including university hospitals)	248	74,645	113,482
Psychiatric hospitals	73	26,268	23,368
Nursing homes	299	40,310	39,468
Institutions for mental defectives	127	25,903	21,898

clinics; these are well developed. About 70% of the relevant age group attend these clinics. Tuberculosis control centers are also run by the cross associations. The national cross association's task is mainly informational.

Apart from the cross associations, there are other associations specializing in certain fields, for example, the foundation for sufferers from kidney and heart diseases.

Numerous organizations cooperate in the National Federation for Mental Health. Each province also offers sociopsychiatric care which may—to an increasing extent—prevent hospitalization in mental hospitals or shorten the duration of such hospitalization by offering better follow-up care.

In the Netherlands, as in other countries, great concern has arisen at the considerable increase in the costs of health care. Although there are many reasons for this increase, it is a stated policy of the government to develop instruments for controlling costs in the future. Therefore the government will take more direct control of health care and public health services. Already the Ministry of Health is trying to reduce the number of hospital beds per 1,000 inhabitants from about 5.4 in 1976 to 5.0 in 1985 by closing parts of hospitals and reducing the approval of construction plans for new hospitals.

This system of health services displays insufficient functional cohesion, both horizontally and vertically; services function independently alongside one another. The present structure for the financing of health care is fragmented and not clear. Because

financing adapts passively to existing organizational situations, it does not exert a corrective influence on the coordination of the various services. There are, for instance, considerable differences in the number of hospital beds per 1,000 inhabitants across various regions. This fact cannot be explained by differences in the health conditions of the population. As one of the structural means of arriving at an effective and efficient health care system, the government is starting a regionalization policy. The country will be divided into areas within which a clear and coherent system of health care services will function.

The Educational System in the Netherlands

Nearly all children receive nursery school education from their fourth or fifth year. At the age of six all children must attend primary school for a period of six years.

Secondary education, with a minimum of three years and a maximum of six years, is conducted in several different types of schools corresponding to the perceived aptitudes of the pupils.

A few historical remarks on secondary education are necessary to understand selection for higher education. In the Netherlands there were two types of secondary education: a *Gymnasium* lasting for six years and a *Hogere Burgerschool* (translated it means something like "citizen high school") lasting for five years. Both types of schools were divided into two streams. The A stream concentrated on languages, history, and geography; the B stream on mathematics, physics, chemistry, and biology. The main difference between the two schools was the inclusion of Latin and Greek in the *Gymnasium* program.

Admission to medical education was based upon success in secondary education. With a certificate or diploma in the B-stream, a student could move into a program of medical education at the university level.

In 1968 a new law came into force for the secondary education system. The possibility of electives and optional subjects at the end of secondary school was the most important difference in relation to the earlier system. The *Hogere Burgerschool* disappeared and was replaced by *Athaeneum*, lasting for six years. Although 14 subjects are part of the secondary school program

as a whole, students only have to elect seven at the level of the leaving examination. There are some restrictions but none that eliminate freedom. This means that since 1974 students with a variety of educational backgrounds have arrived at the university.

A student who wants to study medicine is obliged to study mathematics, English, and Dutch. Furthermore, he has to elect physics, chemistry, or biology. It is possible to start a medical education with only an elementary knowledge of physics and chemistry, chemistry and biology, or physics and biology. The few students who do not elect physics and chemistry can be required to take some additional work in these fields, but admission to university cannot be refused.

To understand the present educational system of the Netherlands, a further explanation is required. There is a clear distinction between higher vocational education and education at the level of the university. This distinction has one important feature in relation to admission procedures. While admission to the university is an individual right regulated by law, admission to higher vocational education is selective. Institutions of higher vocational education can select a limited number of students out of a greater number of applicants. Universities do not have this opportunity. Until some years ago everybody could go to university without a certificate or diploma. If the student could show a certificate of a certain specification, he also could take university examinations. One might assume that higher vocational schools select the better students, leaving the less bright students to the universities. However, an overflow of students from higher vocational education to universities is a traditional difference between these two systems.

Medical Education in the Netherlands

There are now eight medical schools in the Netherlands, organized as a faculty within a university. In the period in which free access to university was guaranteed by law, it was decided that the growing number of applicants for medical study required the foundation of a new medical school. In 1968 it was

decided to establish the school in the southern part of the country, in Maastricht. This new medical school opened in 1974.

Apart from this new medical school, which is organized in a different way, the traditional structure of a medical school is as follows. A preclinical phase of four to five years is followed by clerkships for two years. Recently parliament passed a new law providing a more theoretical phase of four years and a more practical phase of two years—a total of six years of medical education. The new medical school at Maastricht fits into this six year period but the program is more problem-oriented, and tries to integrate theory and practice. There is no structuring into disciplines as elsewhere.

The broad requirements of a medical curriculum are laid down in the so-called Academic Statute. Medical faculties are fairly autonomous in formulating their objectives and structuring their programs. The trend is away from further prescription at a national level, and medical faculties want to defend their autonomy. This results in nationwide and general regulations at the national level, however, which are very difficult to change.

Selection to Medical Education

First period (until 1969)

As stated already, the traditional system offered unlimited access. Every student with the proper certificate could go to his or her preferred medical school. The situation in this first period was comparable to the present situation in Italy. In 1968 the Minister of Education proposed a new law to restrict the number of students who could proceed beyond the first year. His proposal was a combination of free access based on secondary education and selection at the end of one year of medical study. The proposal was, however, rejected by parliament, and so growing numbers of applicants asked for new solutions.

Second period

From 1970 to 1972 placement committees were an important instrument in the admissions process. To maintain free access it was decided that it was rational to distribute the total number of applicants over the seven then-existing medical schools. The placement committee could decide that a student

wanting to go to Amsterdam had to enroll in the medical faculty of the University of Groningen. This committee still exists, largely to act in borderline situations when the number of applicants is equal to or only slightly greater than the number of available places.

Third period (1972-1975)

When growing numbers of applicants made it impossible to handle the problem in this way, parliament accepted a so-called Enabling Law. A limit on access to university could be declared by the Minister of Education, but only for a period of two or three years. This was considered preferable to changing the law which guaranteed the right of free access.

At the time there were advocates of two totally different systems:

1. Some based their argument on the right of free access as it was—and is—guaranteed by law. They held that all applicants had equal rights, and so the only possible conclusion was a lottery with equal chances for all applicants.
2. Others started from the observation that there was a limitation to access. Given this limitation, they proposed a selection system that was based upon the average grades at the end of secondary school.

The solution that was adopted in 1975 was a compromise. Free access was maintained for all students with an average grade of 7½ or more. The Dutch educational system marks on a scale of zero to ten, five or less being unsatisfactory or failing. Students with a secondary school certificate who have not achieved an average grade mark of 7½ or more could participate for the remaining places in a lottery with equal chances for all participants.

Fourth period (since 1975)

After the introduction of the lottery many stressed that the average mark of 7 or 7½ does not indicate any sharp difference between the qualifications of applicants. A new solution was sought in the form of a "weighted lottery system."

Depending upon the average grade mark there is a rising chance of being successful in the national lottery for available

places. An average between 8 and 9 gives better chances than an average between 6½ and 7. A detailed description of this system would require several pages of very impressive formulas. Some of the details are indicated in the results of the lottery of 1976, given in Table 2.

The columns in this table contain the eight medical schools with their usual abbreviations. Each row represents one of the categories which are distinguished in this lottery. From A to F are based upon achievement—the average grade mark—in the final examination of secondary school. Category G represents a category of applicants who earned their right to entrance in an unusual way. A special examination which can be taken at the age of 25 years is one of the possibilities within this category. The categories H and I refer to applicants who finished military services and who finished secondary school in 1974, or in 1973 or earlier, respectively. Category J is reserved for students com-

TABLE 2

Result of Weighted Lottery in 1976

Category	VU	KUN	EUR	RULG	UVA	RUL	RUG	RUU	Total
A. More than 8½	1	3	4	–	4	2	2	4	20
B. from 8 to 8½	9	16	14	6	15	11	15	16	102
C. from 7½ to 8	26	37	231	9	26	17	22	35	195
D. from 7 to 7½	50	45	53	15	57	65	81	65	427
E. from 6½ to 7	69	62	53	11	64	63	51	55	423
F. lower than 6½	63	49	51	5	59	52	63	61	403
G. No average	24	4	5	3	18	6	11	11	82
H. Military service	3	6	1	–	2	1	4	–	17
I. Military service	–	–	–	–	1	–	–	–	1
J. From overseas	1	2	–	–	1	1	4	–	9
K. Foreigners 4%	18	12	8	–	17	9	5	7	76
Case of hardship 4%	11	9	7	1	19	4	13	12	76
Shadow places	10	4	7	–	17	6	4	13	61
Total	285	250	225	59	300	237	275	275	1897

Key to Abbreviations:

VU	Free University, Amsterdam	UvA	University of Amsterdam
KUN	Catholic University, Nijmegen	RUL	State University, Leiden
EUR	Erasmus University, Rotterdam	RUG	State University, Groningen
RULg	State University, Limburg	RUU	State University, Utrecht

ing from Surinam or the Antilles who are selected by the governments of these countries. Category K pertains to students who do not have a Dutch certificate of secondary education; most of them are students from other countries. Among the group listed in the table as "cases of hardship" 4% are students with special circumstances. This 4% of places is reserved—apart from this lottery—for students for whom rejection would result in hardship. The placement committee for medicine has to decide in these cases. If an applicant does not agree with a rejection by this placement committee, he can appeal to a specific committee which makes a final decision.

The shadow places are given to students who were successful in the lottery of 1974 or 1975, but decided to take some additional study related to physics and chemistry or preferred to go to military service.

TABLE 3

Results of the Weighted Lottery Related to Admission Categories, 1976

Category	Number of Applicants	Lottery Factor	Number of Placements	Chance of Success 76	Chance of Success 75
A	20	2.00	20	100	100
B	119	1.50	102	85	82
C	274	1.25	195	71	69
D	749	1.00	427	57	55
E	937	0.80	428	56	44
F	1,053	0.67	403	38	37
G	144	1.00	82	57	55
H	17	2.00	17	100	100
I	1		1	100	
J	9		9	100	
K-1*	35	2.00	35	100	
K-2	42	1.00	41	98	
Cases of Hardship	76		76	100	
Sub-total	3,476		1,836		
Shadow Places	61		61		
Total			1,897		

*The distinction within Category K is based upon a distinction within the group of foreigners. Category K-1 are applicants from developing countries. Category K-2 are applicants from other foreign countries.

In July 1976 there were 3,476 applicants for medical studies. Of these, 77 were handled by the selection procedure for foreigners. Under the hardship clause, 76 applicants got a place; one applicant in category I and nine in category J entered. This left 3,313 candidates for the weighted lottery. Subtracting the places allotted for special reasons there were 1,674 remaining available places. For the regular applicant there was a chance of 1 in 2 to get into one of the eight medical schools. The end result of the selection procedure as it relates to the identified categories is given in Table 3.

The total capacity of all medical schools was fixed in 1976 at 1,897 places. This number can be changed by government each year. The government has to ask for estimates of the actual capacity from the medical schools. There is a tendency to keep this number constant between 1,800 and 1,900. Probably in the near future it will be decided to lower the number of places at medical schools. This is based on the need for physicians estimated for the coming decades.

The weighted lottery system is to be used only through 1978. For subsequent years there are to be recommendations from a committee formed by the government. These recommendations will have to be discussed in parliament, but are not expected to depart significantly from the existing system.

SWEDEN

Helmer Larsson

MEDICAL education in Sweden is the task of the Faculties of Medicine of the Universities of Uppsala, Lund, Stockholm, Göteborg, Umeå, and Linköping. According to the National Central Bureau of Statistics, the number of places available during the autumn 1975 term were the following:

Uppsala	55
Lund	95
Stockholm	185
Göteborg	84
Umeå	51
Linköping	43
Total	513

The Swedish universities teach on a two-term basis. Spring and fall admission to medical education is a normal part of the admissions system. Total annual intake capacity of medical education (autumn semester + spring semester) is (513 + 513) 1,026.

All universities in Sweden are state-owned and the training of prospective physicians is organized in accordance with uniform curricula which are approved by the central government authority on higher education (the National Board of Universities and Colleges), but with some local independence as far as courses, the basic elements of the training program, are concerned. The training of a prospective physician is organized as follows.

Year:		
	1 and 2:	Preclinical training Degree of "medicine kandidat"
	3:	Propedeutic training
	4, 5, and 5½:	Clinical training Degree of "physician"

FIGURE 1
Places with permanent resources for higher education according to 1975 decision of Parliament

● Sites of schools of medicine

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After 21 months of supervised exercise in the medical profession and some tests, the doctor is authorized for further specialist training programs.

The most important training programs for prospective nurses and other medically related occupations and the annual intake capacity are:

Training Program	*Annual intake capacity*
Nurses	2,800
Medical assistants	425
Physiotherapists	250
Occupational therapists	500
Medical laboratory technicians	925

Unlike the training of prospective doctors, these programs are almost everywhere run by the regional self-governing councils. This is because the main social task of these councils is to build hospitals and support them and other kinds of public medical service (free in Sweden, i.e., financed by the taxpayers).

There is another level of medical education which is offered within the framework of upper secondary schools. These are run by self-governing local authorities and are equivalent to the last two or three years of the U.S. high school. They comprise 23 streams, the majority of which are two-year vocationally oriented training programs. One of these streams is devoted to the care of various groups such as babies and patients in hospital.

The Process of Selection

The term "general requirements" for higher education denotes the conditions that have to be satisfied by all applicants irrespective of the educational program involved. These are drawn up in very broad categories.

The special requirements are in addition to the general requirements, and set forth the specific previous knowledge necessary for the particular field of study concerned, as indicated in Table 1. The special qualifications are, thus, directly related to a certain subject or study program of higher education. For example, a knowledge of mathematics, physics and chemistry corresponding to three years of courses in upper secondary school is required for admission to university studies in engineering.

TABLE 1
System of General and Special Requirements for Admission to Higher Education

	A	B	C	D
Special Qualifications	Mathematics Physics Chemistry	History Swedish Civics	English German French	Mathematics Physics Chemistry Biology
General Requirements	Upper secondary school all streams Other educational ways "25:4 qualifications"			

A through C stands for various programs in higher education; D for medicine.

The distinction between general and special admission requirements makes it possible to open very broad ways to higher education and at the same time to secure a necessary standard of knowledge among students for particular fields. The possibilities for an "open university" will be fully used in the new organization of higher education that comes into effect in 1977.

As far as general requirements are concerned the main rule is that admission to higher education is based on the three-year academic streams of the upper secondary school, which include only five of the 23 streams. Also, some equivalent educational paths are placed on an equal footing with the upper secondary school, although admission through these equivalent ways is regulated with many detailed rules.

The requirement of secondary school as a qualification for higher education is combined with the requirement of a minimum average mark for those applicants who have passed through the new integrated school. The minimum average mark should be *2.3* (the scale of marks, founded on a nationwide normal distribution frequency, has a range of 1-5 high). This requirement is the last remnant of the former upper secondary school leaving examination, now abolished in the new secondary school.

As far as special requirements are concerned, the applicant has to achieve at least *2.0* in every secondary school subject

needed. Special requirements for admission to medical education are the following:

Mathematics	—a three-year course
Physics	—a three-year course
Chemistry	—a three-year course
Biology	—a two-year course

These qualifications can be obtained in only one of the 23 streams of upper secondary school and is considered the hardest. To follow this stream is sometimes a kind of status symbol.

The scientific stream is, thus, the only one which can simultaneously give the applicant both the general and special qualifications for medical training programs. Those who have followed other three-year academic streams have to take supplementary courses organized through adult education. Secondary level adult education is organized by the central government (two schools in the country, operating on the basis of correspondence and residential courses), or by the local authorities on a day or evening school basis.

Restricted intake, *numerus clausus,* is characteristic of many training programs at the universities—a result of the great demand for some fields of higher education and the lack of resources to satisfy this demand. As far as medical, dental, technological, etc. education are concerned, this selection is made on a nationwide basis, by a central admission office of the National Board of Universities and Colleges. Every applicant has the opportunity to apply *in toto* for 12 different programs at various universities and colleges of higher education, grouped by the applicants in a preference order. This is made possible by means of a computer-based system. In autumn 1975 the total number of applicants to the *numerus clausus* programs was about 8,700 (including 2,700 female applicants). The total number admitted was 5,200 (approximately 1,350 female).

Broad sections of higher education have had a nonrestricted intake. Further, some sections with restricted intake have during the last few years been attracting a smaller number of applicants than the number of study places available, which has meant that nearly every applicant with minimum qualifications has been admitted.

Competition among applicants for admission to medical education is very high. Applicants in the autumn of 1975 numbered 7,456 (female 4,646). The number of applicants who in fall 1975 put medical education as their highest preference was 1,952 (female 766). The total number of study places available was, as indicated above, 513.

In order to be admitted to medical education, the lowest school mark possible (average of marks on all subjects) was 4.85 (at Uppsala, the most difficult admission) and 4.67 (at Umeå, the easiest admission). The highest possible average mark is 5.0 and is very seldom given. Consequently, only the most shining lights at school have a real chance at medical education. The only exceptions are those few individuals who are admitted on the basis of other criteria, usually vocational, or work-experience. They therefore tend to be somewhat older than the majority of students. The situation in 1975 described above is representative of the admission situation for the last several years.

The typical age distribution of medical students enrolled in a given year is shown below (for the academic year 1973-74):

–19	50%
20-24	33%
25-34	13%
35-	4%
Total	100%

The lowest age possible for admission is 19, the age of school leaving in the three-year academic streams of secondary school.

Rationale for a New Admission System

A parliamentary decision of 1975 mandated that higher education be given a new and more "comprehensive" organizational scheme beginning in 1977. The most important considerations underlying the reform and characteristics of the new *Högskola* as an educational system are outlined below.

§ Higher education *must be broadened;* it must be able to cater to all types of needs in the field of higher education.

§ Interaction between basic studies and *research and research training* should be established throughout the entire *Högskola.*

§ The *Högskola* should be based on democratic governing methods. The interaction desirable between the *Högskola* on the one side and society and working life on the other should be realized more fully within the institutional organization of higher education by recruiting for various bodies in such a way as to strike a balance between the groups and interests concerned.

§ The new *Högskola* should be *decentralized.* A transfer of responsibility and power from central to local and regional bodies is considered to be urgently needed. The units of education and research should be given wider powers and more freedom of action.

§ The new *Högskola* will *comprise far more* than the universities and other postsecondary institutions of today. Higher education should include not only education following the upper secondary school, but also education which, in the eyes of the student or the labor market, constitutes an alternative way to higher education.

§ *A more comprehensive approach* to higher education is now needed following the school reforms enacted during the past few decades. This approach, however, does not exclude variations within the higher education organization.

§ The general goals of school education should also apply to higher education. This means that higher education should be designed to promote such factors and qualities as personal development, greater affluence, democracy, internationalization, and social change. One of the important tasks of higher education is to provide knowledge and skills that will serve as a foundation for vocational activity. Courses of education which today are narrowly specialized and one-sidedly oriented to the exigencies of the labor market should be broadened. Courses of education which today lack elements of vocational preparation should in some way be related to working life.

§ Future planning of the education system should be based on the idea of *recurrent education.*

§ Higher studies should be organized partly as educational *programs,* partly as *single courses.*

Admission Reform

It was considered an anomaly that only a relatively small sector of secondary school (the three-year streams) should serve as preparation for further education at the same time as this school expanded. Its intake capacity corresponds to more than 90% of all comprehensive school leavers.

The Swedish educational reforms implemented during the 1950s and 1960s have resulted in an increased gap, in terms of education, between young people and adults. While two thirds of the adult population have had only six to seven years of schooling, almost 90% of today's young people obtain at least 11 years of formal schooling. This generation gap is expected to widen. Given this situation, it was felt that the admission requirements for higher education should be framed not only in terms of youth education but also in terms of adult life, experiences, and knowledge.

Social disparities in enrollments are another factor behind the admission reform. Participation in higher education varies greatly according to sex and socioeconomic background. In the 1960s, the distribution by social group of the total population and of total enrollments was as follows:

Social Group	*Total population*	*Total enrollment in higher (university-type) education*
I (upper)	11%	42%
II (middle)	39%	37%
III (lower)	50%	21%
Total	100%	100%

In the secondary school, corresponding disparities in economic background are prevalent. In general, pupils from the upper social groups follow the three-year academic streams which lead to university, while the students from lower social backgrounds tend to choose two-year vocational streams. That these social inequalities should not be tolerated in the long run is an important premise of the admission reform.

It is well known, as Table 2 partly illustrates, that admission to higher education "is not a single administrative act, performed when a student moves from secondary to higher education, but a process which extends over a period of years during which a series of selections determines those students who continue toward the goal of ultimate entry to higher education. The first in the series of selections takes place when students complete primary school and enter a program of studies which specifically offers the opportunity of preparing for higher education."[1]

In Sweden, however, all streams can serve as preparations for the *Högskola*. The elimination of selection at 16 is expected to bring about a better social situation and make the pupil's choice less important to his future.

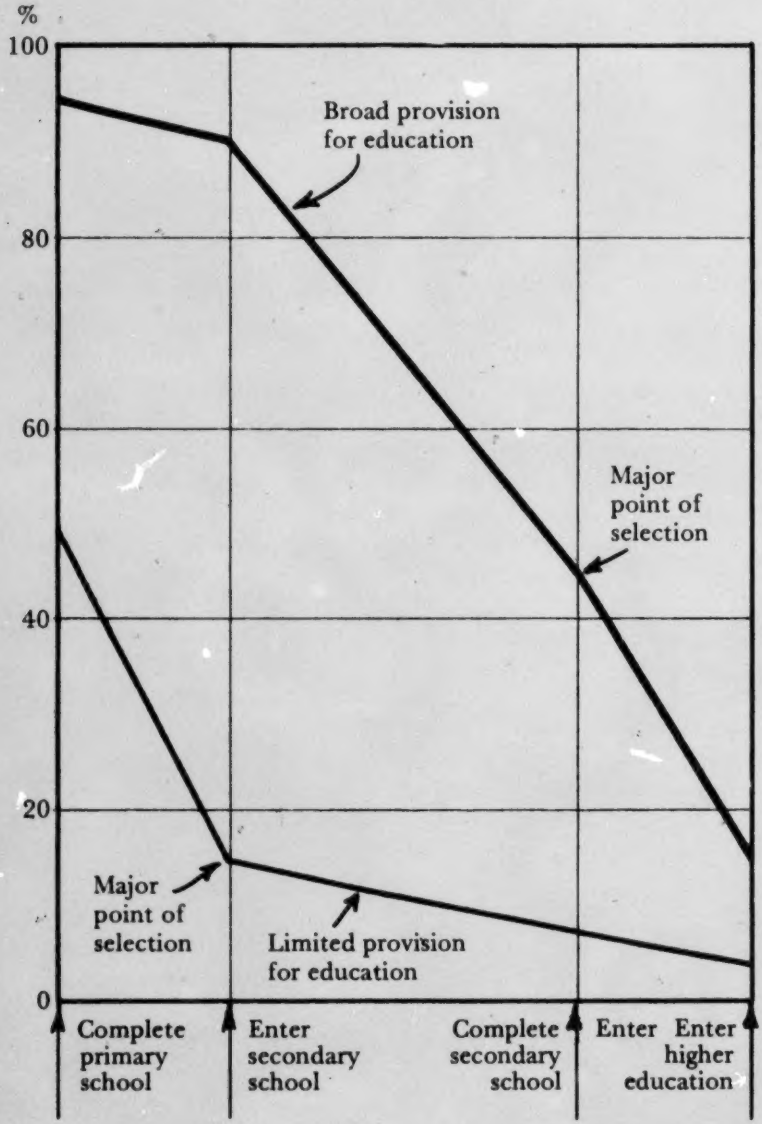
A principle underlying the new admission rules is that formal requirements might be replaced by criteria which also take real knowledge and competence into consideration. Not only school but also education other than school and, of course, working life can provide knowledge which is relevant for higher education studies. In the system in effect until 1977 the possibilities for individual dispensation from the admission rules were considered to be unsatisfactory.

Another guiding principle for the construction of the selection system is that the group of students admitted should have varied backgrounds and experiences. This is attained by an arrangement which divides the applicants into "quota groups." Each group will be allotted places in proportion to the number of applicants per group. This proportional quota system makes it possible, for example, to protect applicants from the two-year streams of the secondary school to be cut out by applicants from the three-year streams.

Also, it has been considered important that applicants have the possibility to add *nonschool credits* to their school marks. School marks alone should not determine a person's chances of entering higher education. At the same time the scramble for

[1] Frank Bowles, *Access to Higher Education*, UNESCO and the International Association of Universities, 1963, p. 26.

TABLE 2
The Admissions Process in the 1950s:
A Comparison of the Two Forms



high marks, a much discussed school problem, can be somewhat reduced. It is also important that a number of the applicants have prior experience of working life, as such experience can be useful both to the educational process and to later professional life. In many cases an early working experience can form a better basis for the choice of an educational program. The crediting of working experience can also be an important factor in developing a pattern of recurrent education.

Working life experiences are considered conducive to a more heterogeneous student group in higher education than was previously possible, in terms of background and experiences. This heterogeneity is *per se* an important goal of the Swedish admission reform, while at the same time the study ability and previous necessary knowledge of students should not be allowed to decrease. Working experience has not, however, been made compulsory for applicants to higher education. On the contrary, a certain percentage of the study places are to be reserved for applicants who are to be ranked solely by their school marks.

The principles of selection of applicants to single courses in various subjects differ significantly from those used for full educational programs. Instead of study aptitude, such matters as the applicant's educational needs, previous training and vocational experiences are taken into consideration. School marks or scores on aptitude tests are not to be used for selection purposes for single courses.

The preceding description of admission reform is relevant also to medical education. In certain respects the problems connected with admission to higher education are especially pertinent to admission to medical training. When enrollment in higher education is analyzed with regard to "more prestigious" education (medicine is perhaps the most prestigious of all education), the disparities are still more obvious, to the disadvantage of the lower social groups. Cases are known of about 60% of students in a medical faculty coming from social group I.

There is much discussion on whether high school marks, which are absolutely necessary for enrollment in medical education, are the best instrument for selecting the best prospective doctors. There are tendencies among secondary school leavers

with very high marks to choose medical training on account of this high level. It has therefore been suggested that prospective doctors should have working life experience before their medical training in order to provide them with a broader social frame of reference and a resultant better understanding of their patients from other social groups.

The rules of general qualification and selection criteria are to be settled by the parliament and the government. Thus, very different higher education programs follow the same rules of admission and selection, although the special requirements are different.

The special requirements as a rule are decided by the central or local authorities which establish curricula and syllabi for higher education. The curricula and syllabi of general educational programs, which are to be organized all over the country, are decided by the National Board of Universities and Colleges. For the rest, the decisions are taken locally. Government can lay down special rules for a certain educational program. Moreover, authorities responsible for admission have the right to make exemptions from the general rules for individual applicants.

The New Admission System

The new admission system, also used for admission to medical education, is composed of the following main rules:

§ The completion of studies in at least a two-year stream of upper secondary school (dropouts from three-year streams are *not* qualified);

§ equivalent courses of education, comparable to the streams of upper secondary school, should carry general qualifications on the same terms as the latter (a number of courses, vocational and non-vocational, including courses at peoples' high schools, can provide this qualification).

In both cases, a knowledge of Swedish and English corresponding to not less than two grades of upper secondary schooling must be included or otherwise obtained.

The general qualification requirements will also be met by

those who are at least 25 years old and have been gainfully employed for at least four years (previously within the framework of an admission experiment for certain courses at the faculties of arts and of social and natural sciences it was 25 *plus five* years). These persons must have the stipulated knowledge of English because command of English is generally needed to be able to pursue higher studies successfully.

For the special qualifications a requirement of quality is imposed. An average mark of 3 is needed. All requirements of this kind shall be indicated as one, two, or three years of courses of upper secondary school. It is important, however, that the principle of "real knowledge above formal credits" should also be followed here, which means that equivalents to secondary schooling can be accepted as well as relevant working experience.

When selection is necessary, it is arranged in the following way. (Details of limited importance for the understanding of the system are omitted here.)

a. The applicants are divided into four groups or quotas, which are allotted study places in proportion to the number of applicants per group (a proportional quota system). Technically, the groups are defined by comparing the applicants' marks.
   1. applicants with three years of upper secondary schooling or other equivalent education;
   2. applicants with two years of upper secondary schooling or other equivalent education;
   3. applicants from peoples' high schools;
   4. other applicants, i.e., in the first place people with "25.4 qualifications" (see above), in the second place applicants with qualifying education which, however, is not comparable with the merits of group 1, 2, or 3 on account of different scales of school marks.

b. A fifth group, consisting of applicants with educational qualifications from other countries, is not proportionally determined but is allotted a number of places—not exceeding 10%—in advance.

Selection instruments in the various groups are as follows:

in groups 1 and 2 credits calculated upon school marks and upon (voluntary) working life experiences;

in group 3 credits corresponding to the assessment (or average of assessments) given at peoples' high school, to some extent equivalent to school marks; credits for (voluntary) experiences from working life are to be added to the assessment points, as in groups 1 and 2;

in group 4, credits for working life experiences and merits gained through the voluntary aptitude test.

In the four groups, the applicants are ranked according to their credits, and selection is made from the top of the ranking list. In the "foreign group," the credits of the applicants are estimated more informally and individually.

In groups 1 and 2 the maximum credit sum of marks is 5 and of working life experiences 2. The latter sum is to be added to the first one. Working life for more than five years does not give credits.

Any kind of working experiences, including, for example, child care at home and military service, will give credit points provided that the duration of working periods amounts to at least 15 months altogether. At least one period is to last not less than nine months (in the same employment or equivalent). Credit points are to be given for working experiences up to a maximum of five years (2.0 points); a period of three months is equivalent to 0.1 point. Positions of trust in labor unions, consumers' co-ops, or other associations can give additional points so that the maximum sum can be 2.5.

The selection rules guarantee a limited number of applicants, corresponding to a certain percentage of all study places, a possibility to pass directly from upper secondary school to higher education. Even if working life experience is deemed very valuable, it should not be impossible to enter higher education without such experiences.

In group 4 many applicants will probably have working life credits at a maximum. For this reason the voluntary study aptitude test is likely to be taken by the great majority of the applicants who in this way can acquire two further points at most, i.e., equal to the maximum credit sum for working life experiences.

If the credit sums of two or more applicants are equal, the order between them is determined by means of their priority for the educational program concerned. In the last place, the ranking is decided by lot.

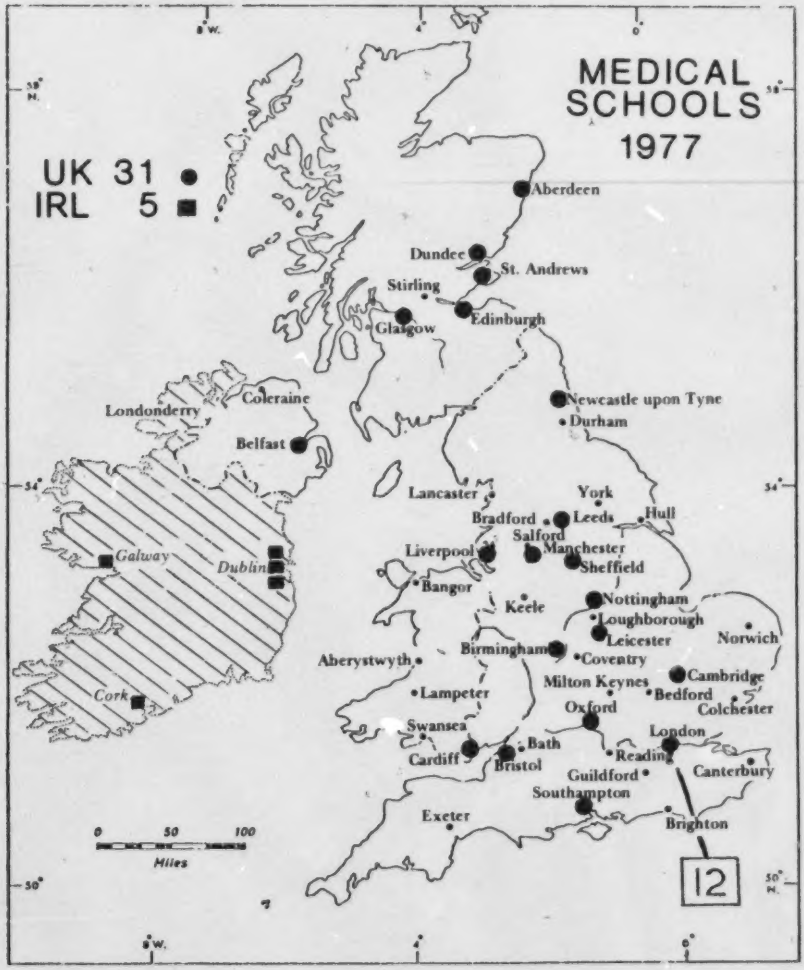
A shorter training program for prospective doctors was recently set up by the Swedish Parliament. This medical education will be open to nurses only.

Future Changes

The fact that Swedish secondary adult education, like all other public education in Sweden, including higher education, is free of charge may counteract hesitation to embark upon a long-term training program. The same effect can be expected of the Swedish system of study loans, combined with grants, which is open to practically all students above a certain age. A special importance should be attributed to a supplementary program of study grants aimed at adult students at all study levels which is now being gradually introduced.

The introduction of new admission and selection rules launches a great social experiment, the consequences of which cannot be completely foreseen. It is, therefore, necessary to follow continuously the application and consequences of the new system and adjust it as necessary. This idea was given the full support of the Minister of Education in his 1975 Reform Bill on higher education.

The evaluation of the reform of higher education is a continuous job in which a great number of higher education agencies must be involved. It is, however, a special task for the division of development and research of the National Board of Universities and Colleges. Medical education will be included in this evaluation, which should also be carried out by the medical training institutions themselves.


MEDICAL SCHOOLS 1977
UK 31
IRL 5
Aberdeen
Dundee
St. Andrews
Stirling
Edinburgh
Glasgow
Newcastle upon Tyne
Durham
Londonderry
Coleraine
Belfast
Lancaster
York
Bradford
Leeds
Hull
Salford
Manchester
Liverpool
Sheffield
Galway
Dublin
Bangor
Keele
Nottingham
Loughborough
Leicester
Norwich
Aberystwyth
Birmingham
Coventry
Cambridge
Milton Keynes
Bedford
Colchester
Lampeter
Oxford
Cork
Swansea
London
Cardiff
Bath
Bristol
Reading
Guildford
Canterbury
Southampton
Exeter
Brighton
0 50 100
Miles
12

UNITED KINGDOM

A. D. M. Greenfield

IN the United Kingdom the General Medical Council is the statutory body which regulates undergraduate medical education and the examinations for a primary medical qualification. The Council is concerned with entry to medical schools and their systems of examination and assessment. The Council obtains information on these matters by correspondence, annual questionnaires and also, when necessary, by sending visitors and inspectors to the medical schools and examinations. It also seeks to improve the quality and suitability of medical education by issuing recommendations, arranging conferences, and collecting and disseminating information.

The undergraduate course leading to a medical qualification lasts for not less than five years and in a few instances for six years. A further year's experience in resident hospital appointments is required before entry into independent medical practice. The Council maintains a register of the names and qualifications of those who have completed these requirements and thereby become legally qualified to practice.

Medical Education in the Context of Higher Education

In the United Kingdom the main instruments of higher education are the universities, the polytechnics, colleges of technology, colleges of education and colleges of further education, and schools and colleges providing training for a wide range of professional groups, such as nurses, radiographers, occupational therapists, speech therapists, and others.

Undergraduate medical education is wholly provided by medical schools attached to universities. Both the universities and the polytechnics contribute to the training of the professions supplementary to medicine. Universities are empowered by their charters to award degrees, and they also increasingly validate degrees in associated Colleges of Education (for those training as teachers for service in schools). Degrees awarded to students in other institutions are supervised and validated by the Council for National Academic Awards.

Funding of Medical Schools

The universities are largely supported by central government funds distributed by the University Grants Committee, which is a body with a preponderance of university members, and is particularly well equipped to carry out peer evaluation of proposals put to it. In addition, universities have income from endowments, research grants, research contracts and tuition fees, and they charge fees for the use of residential accommodation. About 7% of income has come from tuition fees (see Table 1 on universities' income) but this will rise because the fees were greatly increased in October 1977. Although there are differences between the costs in the various faculties, these are not reflected in the fees charged to students.

Clinical teaching in medical schools is to a considerable extent provided by doctors who are employed in teaching hospitals by the National Health Service (N.H.S.) and not by the university. The university is represented on the appointments committees for such doctors and generally accords them an honorary

TABLE 1
U.K. UNIVERSITIES
INCOME

	1965-66	1973-74
	%	%
Government grant	74.0	78.0
Fees	7.0	5.0
Endowments	2.0	1.5
Research Grants	11.0	11.0

Source: *The Times Higher Education Supplement*, 24 Dec. 1976.

university title. The Health Authorities provide an enhanced level of staffing in teaching centers, so that N.H.S. doctors can have time to participate in teaching and research work. Thus the cost of clinical teaching falls partly on the N.H.S. The size of this additional cost is extremely difficult to determine. It has been examined recently by the Resource Allocation Working Party of the Department of Health and Social Security. Their estimates (Second Report) suggest that the additional costs of teaching hospitals over and above service hospitals may be of the order of £10,000 per year for each clinical student receiving instruction. (This figure does not reflect the actual direct costs of teaching; it represents the increase in total costs that are found to be incurred in U.K. hospitals with a substantial teaching program.) The Working Party found that there are large differences between the different teaching hospitals in the extra costs of teaching which are calculated according to their formula, differences not wholly understood. The contribution of N.H.S. staff to teaching is reciprocated by the contribution of university clinical staff to the care of patients.

Financial Support for Medical Students

All school leavers who have been resident in the United Kingdom for three years or more, and who have not previously received support for a course of higher education, are eligible to receive mandatory grants from their home Local Educational Authority to cover their tuition fees and maintenance while at university. For medical students, this continues for the full five years of their course. The only proviso is that parents are required to contribute a part of the total cost on a scale related to their income. The contribution may vary from nothing to the whole cost, less £50 per year. Unfortunately, parents are more likely than Local Educational Authorities to default or to be late in discharging their obligations, and it is the children of the middle class or relatively wealthy who may suffer hardship. Although the level of grant support is considered by students to be rather inadequate, and although there are difficulties due to the inflation of costs outpacing the increases in grants, generally speaking students coming from school are relieved of financial

worries up to the time of graduation. There is no question of repayment of grants, and there are no restrictions as to place or country of work after the course has been completed.

Mature students, 25 years of age or over, have support available for their dependents also. Those who have graduated previously in another subject and have already been supported for three years are unlikely to be given fee and maintenance support for more than two years of the five-year medical course, and the provision of even this support is within the discretion of the Local Educational Authority.

Numbers of Entrants to Higher Education and to Medicine

The statistical analysis published by the Department of Education and Science showed that of the 681,450 pupils leaving schools in England and Wales in 1973-74, 5.5% entered universities, 2.4% colleges of education, 1.9% polytechnics, 10.1% other full-time education, and 80.1% entered employment. The minimum age for leaving school was 16, but in addition to those going on to higher education, many stayed on to 18.

There are at present 46 universities in the United Kingdom, including the new and novel Open University which conducts its affairs very largely by correspondence, supplemented by local tutors, television, and short residential courses held in other universities in the vacations.

TABLE 2
U.K. UNIVERSITIES*
Undergraduate Entry, All Subjects, 1976

		Candidates	Admissions
Home:	Men	77,731	43,932
	Women	44,073	25,407
Overseas:	Men	15,885	4,261
	Women	4,618	1,218
Total		142,307	74,818

*without the Open University

Source: University Central Council on Admission, 14th Report.

The ages of the 65,749 home-based candidates who entered U.K. universities in 1975 were: 17 years, 4.7%; 18 years, 59.7%; 19 years, 22.2%; 20 years, 4.4% and 21 years and over 9.4%. Overseas candidates (few of whom, however, entered medical faculties), tended to be older. Of the 5,462, 45.5% were 21 years and over, and 10.2% were 25 years and over. Among both home and overseas candidates, the women were on average slightly younger than the men.

The universities have 31 medical schools, of which no less than 12 are within the University of London, 12 in provincial England, 5 in Scotland, 1 in Wales, and 1 in Northern Ireland. Of the 31, one provides only the preclinical part of the course and arranges for clinical teaching elsewhere, and one provides only the clinical course, drawing students to it from elsewhere.

The policy of all universities and medical schools is to admit the number of students for whom they can provide or arrange teaching facilities for the whole course up to the point of graduation. Those admitted do not face competition for places at a later stage in the undergraduate course. They are, however, required to make satisfactory progress. Only a small number fail to do so, contributing to the "wastage" which in the case of medicine amounts to about 5-8% of those admitted.

The Report of the Royal Commission on Medical Education, published in 1968, contained estimates of future national requirements for doctors, and provided a renewed impetus for

TABLE 3
U.K. MEDICAL SCHOOLS

Intake		Output		Wastage
1969	2695	1974	2543	5.7%
1970	2878	1975	2644	8.1%
1971	3032	1976	2749	9.3%

increasing the training of them. Figures for annual entries are: 1960-64, 2,030; 1973, 3,276; 1975, 3,459; 1980 (planned), 3,945. The increases depend on expanding existing schools,

adding a clinical component to the Cambridge school, and establishing new schools in Nottingham, Southampton, and Leicester. These three are the only new schools established in this century.

TABLE 4
U.K. MEDICAL SCHOOLS
1975

Admissions	No. of Schools
161-200	3
141-160	4
121-140	3
101-120	5
81-100	8
61- 80	3
41- 60	5

Educational Experience of Candidates for Medicine

The great majority of entrants come, at the age of 18 or 19, straight from schools. In the United Kingdom, schooling is provided free within the state system, and this is increasingly and nearly wholly arranged in comprehensive schools. These accept pupils of all abilities, but seek to provide them with a suitable range of educational opportunities. There is also a smaller private sector, many of the schools in what are confusingly called "public" schools. This sector depends on endowment support and fees. In both sectors medical candidates receive a general education in a fairly wide range of subjects up to the age of 16, and then concentrate on three or occasionally four subjects up to the age of 18. Their performance at these two stages is tested in the General Certificate of Education (GCE) examinations. These are conducted by eight examining boards, of approximately equal standards. Seven of the eight operate under the aegis of universities. The examinations normally taken at 16 (in perhaps 5-10 subjects) are at "Ordinary" level (O-level), and the examinations normally taken at 18 (in 3 or, occasionally,

4 subjects) are at "Advanced" or A-level. At both O- and A-level, the passes are graded, and the grades are recorded.
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To be eligible for consideration candidates must satisfy the formal requirements of the medical schools, as well as the General Medical Council. Among these are that they must have passed at A-level in three subjects, of which one must be chemistry and the other two must be in essence biology, physics, or mathematics. The "missing" subject is usually required at O-level.

Because of the competition for places, candidates actually admitted to medical schools have normally greatly exceeded the minimum requirements. Many have passed in eight or ten or even more subjects at O-level, and of these several passes may be at a high grade. Some candidates have passed in more than three subjects at A-level, and the passes in the obligatory three subjects are at high grades, and often at the top grade. Candidates who offer a fourth A-level, particularly if it is an arts subject, are generally welcomed.

A few medical schools accept some students with arts rather than science A-levels into a preliminary year of study in chemistry, physics, and biology, before starting the medical course proper. Currently, the General Certificate of Education examinations are under discussion, and there are proposals to increase the range, but reduce the depth, of the subjects taken at Advanced level. If these proposals are adopted, some adjustments will be necessary in the undergraduate medical curriculum.

Most medical schools allow, and a few medical schools encourage, candidates from school who have been awarded a place to defer entry for a year to gain extra experience. There must be a desire on the part of the candidate, and generally the medical school must be satisfied about the value of the proposals. A broadening of experience rather than work in the medical field is generally favored. However, few students spend a year in this way.

The pressure on medical school places from home-based candidates is currently so great that medical schools are rather unwilling to accept candidates from other countries. Training is in any event judged by many to be more appropriately provided in the country where practice is to be conducted. Some schools,

however, are willing to offer a few places to candidates from the decreasing number of countries which have not yet established their own medical schools, or perhaps discriminate against some of their own nationals at the point of selection. A fair proportion of home-based students are fairly recent immigrants, or children of fairly recent immigrants.

TABLE 5
U.K. UNIVERSITIES
Entry to Medicine in 1976

		Candidates	Admissions
Home:	Men	6,438	2,259
	Women	3,259	1,273
Overseas:	Men	1,795	93
	Women	523	22
Total		12,015	3,647

Source: University Central Council on Admissions, 14th Report

Most medical schools admit a small proportion of "mature" candidates, and these fall into two main groups. The first group comprises university graduates, often fairly recent ones, in other disciplines. First degrees are normally awarded at the age of 21 or 22, and graduates offered places have normally gained degrees with first class or upper second class honors. Graduates in subjects related to, but not part of, the medical course, are sometimes preferred. They bring additional skills to medicine. Some mature students have Ph.D. degrees. The second group of mature candidates includes those who have successfully followed a career in a paramedical or an entirely separate field, and have demonstrated their determination to study medicine by gaining the necessary entrance qualifications, often under difficult conditions, and perhaps at the age of 30 or more. Both groups are individually considered on their merits and on the financial viability of the candidature.

National Arrangements for Applications to Universities

Admission to all universities (and therefore medical schools) in the United Kingdom, other than the Open University, is ad-

ministered but not controlled by the Universities Central Council on Admissions (UCCA). All candidates are required to submit applications to UCCA through the head of their school. The candidate provides information about age, sex, nationality, schools attended, and details of the subjects taken or still to be taken in the GCE examinations at O- and A-level, with the results and grades obtained. The candidate is also asked to mention any practical experience, study abroad, occupation and and studies after leaving school, career intentions, proposals for the year between school and university if this is desired, and any intellectual and social interests. The candidate indicate five preferences, which may be in order or may be equal, for the universities and the courses selected.

The head of the school or his deputy checks the accuracy of the examination information provided by the candidate, and writes a confidential report, which is normally very helpful to the selectors, and deals with intellectual qualities, suitability for the chosen course in terms of personality and motivation, powers of expression at interview and in writing, and any special factors that in fairness to the candidate or the university should be known. Schools are invited to mention any special policy they may follow in entering candidates for GCE examinations, and any special difficulties that their candidates may have had arising from staffing problems or reorganization of the school. The forms are sent to UCCA, which distributes facsimile copies to the five universities of the candidate's choice, and monitors all decisions subsequently taken by the selectors in the universities. There is therefore accurate information about all applicants and the fate of their applications. UCCA regularly publishes statistical information and analyses, which are of considerable interest and value.

The Number of Applicants from whom the Medical Selection is Made

Since 1973, between 12 and 13 thousand candidates have applied each year for the 3,000-plus medical places available. The first and perhaps most important selection is made by the candidates themselves, when they decide whether or not to apply for

a medical place. Candidates are free to do as they like, but no doubt many are influenced by the advice they receive from their schools or from other sources. They must decide whether they want a medical place, and, if so, whether they have a reasonable chance of success, in the face of competition. Those who doubt their chance of success may well apply for other subjects. Such considerations may explain why women form only about 30% of medical candidates.

Of the applicants for medicine, nearly as many are eventually accepted for university places in other subjects as gain places in medicine. See the following two tables for data on student backgrounds in 1966.

TABLE 6
U.K. MEDICAL SCHOOLS
Percentage of Entrants in 1966 with Medical Fathers

Scotland	17.7%
Oxbridge	27.0
London	26.3
Provinces	14.0

Source: *Report of the Royal Commission of Medical Education*, London, H.M.S.O., 1968.

General Arrangements for Selection by Universities and Medical Schools

The academic year starts in October. Applications must reach UCCA in the previous autumn; by October 15 if Oxford or Cambridge is included among preferences and by December 15 if they are not. The majority of candidates, at the time of application, have not attempted their A-level examinations. These are normally taken in the June immediately preceding entry, and the results are not available until late in August. A provisional selection of candidates must therefore be made, based on the information available on the UCCA form, including any predictions the school may offer of the probable results of the A-level

examinations. Each university faculty is free to use this information in any reasonable way, and to supplement it by offering interviews or special tests to candidates. This stage will be considered in more detail later.

Offers are then made by medical schools to selected candidates, usually during the months of December, January, and February, conditional upon the candidate's attaining a stated level of achievement in the A-level examinations. The stated level of achievement is determined by experience of filling places in previous years. In medicine and one or two other currently oversubscribed disciplines, the level of achievement set is uncomfortably high, because of the desire to allocate places fairly among the applicants. There are differences, but not very large ones, in the standards required by the various medical schools.

Schools are in competition with each other for the best candidates, but they are restrained from requiring excessively high grades at the time of making offers by the likelihood that candidates will prefer to accept other more reasonable offers which they may hope to satisfy.

An offer made by a medical school is binding upon the school subject to the set conditions being met by the candidate. Candidates are, however, allowed to provisionally accept two offers simultaneously until May and must firmly accept their preferred offer by May 15. Where candidates are offered different conditions by different medical schools, they have to judge whether

TABLE 7
U.K. MEDICAL SCHOOLS
1966 Entry

Socio-economic Class	1	2	3	4 & 5
Scotland	33.0	34.5	28.1	3.3
Oxbridge	51.0	36.6	7.4	2.0
London	44.5	36.9	14.6	0.9
Provinces	30.6	36.5	27.5	3.9
1961 Census	2.8	15.5	49.9	31.8

Source: *Report of the Royal Commission of Medical Education*, London, H.M.S.O., 1968.

or not they are likely to be able to satisfy them, and make their acceptance accordingly. Once the firm acceptance is made it is binding upon the candidate.

Schools aim to make the number of offers which will nearly but not quite fill the places available. They know by experience how many offers to make. Some may not be even provisionally accepted by the candidates. Some provisional acceptances do not lead to firm acceptances. Some candidates who firmly accept do meet the conditions which have been set. When the A-level examination results are announced in August, schools may fill any remaining vacancies in two ways. The first is to relax the conditions set for candidates who have not quite met the conditions originally set. The second is to admit candidates from UCCA "Clearing." These are candidates who have received no offers, but may have passed the examinations with very creditable grades, and sometimes with better grades than accepted candidates. A difficulty is that there is little time to process "Clearing" applications and to make firm arrangements between the medical schools and the applicants.

Selection of Candidates by Individual Medical Schools

Selection is recognized to be a most important activity. The reputation of the school, and the future quality of medical care in the country depend in no small measure upon it. It must be fair and reasonable between all the candidates who apply. It must also be seen to be fair. It is illegal to discriminate between candidates on grounds of race or sex, and it is important to avoid any appearance of such discrimination.

However, the resources available for selection are inevitably limited, and each school has to decide how best to deal with the very large number of applications, averaging 2,000 per year, received from UCCA. Schools do not publish the details of their methods, but it is clear that these vary quite widely. Most schools interview some or all of the candidates to whom they eventually offer places. This involves a preliminary selection (from the information on the UCCA forms) of perhaps two or three times as many candidates for interview as there are places available. An undoubted advantage of the interview is that the

candidate visits the school and meets the students. Since most candidates prefer medical schools distant from their homes, this is nearly always their first visit. In addition to interviews, a few schools ask candidates to take brief written tests intended to measure intelligence or aptitude. Oxford and Cambridge conduct their own examinations for entrance.

All schools are, at least nominally, selecting for a basic medical course, which prepares graduates to specialize in the postgraduate years in any desired direction, including family or "general" practice. This suggests that there is a positive merit in having a diversity rather than a uniformity in the student body.

Probably all schools look for a serious motivation if not a dedication to become a doctor, an academic capability equal to the demands that will be made upon it, stability of character and temperament, ability to communicate verbally and in writing, a determination to stay the course, and, desirably, evidence of special interest or excellence in some activity or field of endeavor. How the various attributes are weighted and assessed depends on the selectors.

In Nottingham we have six independent teams of selectors, each dealing with a random one sixth of the applications. The preliminary selection is made by academic staff, but for the interviews the third member of the panels is drawn from the large number of doctors associated with the school. We do not include present students or lay persons on the panels, as do some other medical schools. The spread of responsibility varies widely between schools, but in most schools it is widely shared.

Comments on Current Selection

It has to be admitted that we have no effective means of measuring whether individuals participating in selection, or the institutions they serve, are making good decisions. We rely on the corporate view of Faculty Boards that the selection procedures are as good as we can devise in all the circumstances.

In most schools the process is heterogeneous, being operated by individuals who, while accepting generally agreed policy, usefully bring an individual viewpoint to their work. The success of selection should presumably be judged by the quality of the

working life of those chosen, rather than by success in examinations during the undergraduate period. Thus the index of success itself is difficult to measure, and very remote in time. It can hardly influence current practice.

A further difficulty is to discern the qualities which may be most important in the future. Selectors probably tend to choose candidates for medicine as it is now.

Academic achievement is one of the few qualities possessed by candidates for which a scale of measurement, however imperfect, exists, and is certainly the only such quality concerning which information is available on the application forms. It is inevitable, therefore, that it should assume a dominant role in selection when the competition for places is intense. It is clearly easier to compare candidates on academic grounds than it is to compare other important qualities of character which may be judged subjectively, but cannot be measured. It is easier to defend academic comparisons than other comparisons. There must however, be reservations about them. They depend on the quality of the school as well as on the quality of the candidate. Not nearly enough is known about academic performance at 18 as an indicator of future potential; in particular we do not know whether in this respect the sexes differ. And academic performance indicates only one aspect of a candidate's ability.

A matter of very general concern is whether medicine should, as it now does, cream off a considerable fraction of the most able school leavers. It could be that the future health and well-being of the country would be better served if some of these entrants chose to make their careers in other fields of service and endeavor.

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UNITED STATES

John Z. Bowers

THERE are 112 medical schools accredited to award the M.D. in the United States, about half of which are termed "state" schools and the other half, "private" schools. There are three schools, The University of South Dakota, University of North Dakota, and the University of Nevada, that have offered only the first two years of the medical curriculum in the basic science courses. They are now converting to complete medical schools granting the M.D. degree.

Today, there is only one two-year school, the University of Minnesota Duluth School of Medicine. Its students are guaranteed transfer to the University of Minnesota in Minneapolis, or may seek admission to another four-year school.

The state schools receive their basic financial support from the state in which they are located, while the private schools depend upon financial support from endowments, individuals, and other nongovernmental sources. A number of the private schools receive substantial support on a capitation basis from the state in which they are located. Both the private and state schools receive their major financial support from federal sources. The aggregate of federal and state support is estimated to represent about 85% of the medical schools' budgets.

The state school is subject to the will of the state government. Thus a state may decree an increase in the number of admissions, an increase in tuition fees, the establishment of new programs such as education in Family Medicine, and affiliation with hospitals in undoctored areas. The state schools give preference to applicants who are citizens of the state; private schools recruit students from across the nations.

There are two predominantly black medical schools and a third is in the early stages of development. The last of the women's medical schools became an integrated institution in 1970.

By the late 1950s, the government, the public, and segments of the medical profession had become increasingly concerned over the apparent growing shortage of physicians. Federal subsidies for the construction of new medical schools became available in 1963 and led to the first major effort to create new medical schools in 50 years. The number of medical schools increased from 89 to 112 in the decade 1965-75 and the number of graduates from 7,800 to 14,300 per year.

The number of applicants during the same period increased from 18,703 to 47,303. In 1975-76, there were 42,303 applicants and they submitted 366,040 applications, a ratio of 8.7 applications per individual. We enrolled 15,351 first-year students, which represents an applicant/acceptance ratio of 2.8. The number of graduates in 1976 was 13,561. By 1980-81 first-year students are projected to reach 16,063 with graduates at 15,512.

Medicine continues to be the most popular profession for college students. At some of the leading colleges as high as 75% of incoming freshmen rank medicine as their first career choice. Law has risen rapidly in popularity. Engineering careers became somewhat less popular with the decline of the space program, but with the national emphasis on environmental problems there is a resurgence of interest in engineering.

The intake of women has increased sharply as a result of the women's liberation movement, federal requirements, and philanthropic efforts. Today women make up 20.5% of all students enrolled, an increase from 9% ten years ago. In some schools one third of the incoming students are women, and in the late 1980s the national level should reach that figure.

While blacks represent 11% of the U.S. population, ten years ago only 2% of the medical students were black. Other minorities—Mexican-Americans, Puerto Ricans, and American Indians—were also under-represented. Federal legislation requiring equal opportunity, a commitment by many medical schools, and philanthropic initiatives stimulated a significant increase in the intake of minorities which tripled between 1966 and 1970. Since

1970 intake has levelled off because of a dwindling pool of qualified applicants, loss of commitment by the medical schools and their national leadership, lack of federal scholarships, and legal actions against special programs establishing quotas for minority students. In 1975-76 first-year minority students made up 9.3% of the total medical school enrollment.

Foreign students represent 1.2% of the total enrollment with the largest number coming from the Far East followed by Central America and Africa. Practically all foreign students have enrolled in an American college or university for their premedical education.

The size of the entering class and total enrollment show major variations. In general the state schools have larger student bodies than the private schools. Thus, the University of Michigan Medical School admits 247 students while a private school, Stanford, admits 85 students. Every medical school has a *numerus clausus* which is determined primarily by the faculty. It is subject to approval by the Liaison Committee on Medical Education, which is the national accrediting body for medical education. The Liaison Committee is a nongovernmental body constituted of representatives of the Council on Medical Education of the American Medical Association and the Association of American Medical Colleges. However, as noted, a state may require a school to expand intake. Further, federal grants for program support or construction may require an increase in the size of the first-year class.

A major point of controversy today is a requirement in the new Health Professions Educational Assistance Act of 1976 (PL94-484) that the schools must reserve an "equitable number" of positions for U.S. citizens enrolled in foreign schools before October 12, 1976. The students would be designated by the Secretary of Health, Education, and Welfare, and the schools see this as the expansion of federal control of education.

Tuition

In contrast to many other countries, all U.S. medical schools charge a tuition fee. The fees vary widely; private schools are substantially more expensive than state-supported schools.

Tuition fees in the state schools are significantly lower for residents of the state than for out-of-state students. The estimated tuition fees for residents attending public medical schools in 1976-77 ranged from $300 to $3,500 per year. For nonresidents tuition varied from $570 to $4,808, bringing it close to the tuition fees of private schools which range from $1,050 to $6,000.

There are wide variations in estimates of the cost of educating a medical student. A study in 1972-73 reported an average cost per student of $12,600 with a range between $6,900 and $18,600. Another study for the same year estimated a range between $16,000 and $26,000 per student. A major variable is the determination of the allocation of costs of teaching hospitals.

Medical students derive their support from a variety of sources: family, loans and scholarships, employment of the student and of the spouse, and savings.

Preparation for Medical Education

Education usually begins at the age of six years, with six years of primary education, followed by three years of junior high school and three years of high school, a total of 12 years. Most students receive this phase of their education in public schools which are operated by municipal or county governments and are free. In a few areas such as the South and the Northeast, some families choose to send their children to private schools.

Requirements for Admission

After completion of secondary school, prospective medical students enroll in an independent college or in the division of arts and sciences of a university, and most complete a four-year program leading to a baccalaureate degree. Ten percent of the students complete only three years of college and one percent, two years, before applying to medical school. Most of the students with less than four years of premedical education are enrolled in special programs which are designed to shorten the total span by combining premedical and medical education. In 1976-77 nine medical schools accepted high school seniors directly into the M.D. program, but on a provisional basis.

The major requirements for admission to medical school are: general and organic chemistry; biology, including cellular and molecular biology; modern physics and English. Half of the medical schools require mathematics, usually with calculus. Students may be required to have studied a foreign language and are encouraged to diversify their education with courses in the social sciences and the humanities.

A significant development has been the sophistication of quantitative biology courses now being taught at leading colleges and universities. Based on biochemistry and genetics, these courses provide prospective medical students with a great deal of the knowledge that was formerly taught in the basic science departments of the medical schools.

The intense competition for admission to medical school with the emphasis on grade-point averages has turned preparation for medical education into a "battlefield." Students are known to give misleading answers to questions by colleagues and to falsify laboratory procedures in the hope that their own academic record will excel in comparison.

The premedical grades of first-year medical students have risen steadily since 1967. In 1975, 44.2% of admitted students had averages of A (3.6 to 4.0 on a four-point scale), 47.4% were B (2.6 to 3.5), and 2.4% were C (less than 2.6); 6% were unknown. An estimated 13,000 applicants who were qualified for admission were not accepted in 1975.

There is no way of determining the number of Americans studying outside the United States, Canada, and Puerto Rico. Such enrollment has become an increasingly popular alternative for U.S. students who are determined to study medicine but unable to gain admission to a U.S. school. Estimates usually place the figure at 5,000 with the largest number, over 2,000, at the Autonomous University of Guadalajara, Mexico. A substantial number attempt to transfer, and in 1975 of 664 students taking Part One of the National Board Examination to qualify for consideration for transfer, only 377 or 56.8% passed the examination. Two hundred and ninety seven were admitted with advanced standing.

If a graduate of a foreign medical school has fulfilled all requirements for licensure in that country and passed the examination of the Educational Commission for Foreign Medical Graduates, he is awarded a certificate that permits him to enter internship and residency training in the U.S.

Curriculum

Historically, the medical school curriculum extended for a total period of four years. A major shift from a four-year to a three-year span was introduced by a number of schools in the late 1960s. This reflected the pressure for more doctors and for use of expensive medical facilities on a year-round basis, and the availability of federal grants to support such programs. The three-year program was especially popular for a number of new medical schools, and it became possible to complete medical education in three years in about one third of the medical schools. Some schools offered the standard four-year, as well as the three-year, curriculum. Today the three-year program is waning in popularity because of the undue demands on faculty as well as students, and the withdrawal of the federal financial inducement. Thus, in 1973, a total of 16 schools had such programs, but in 1976 the number had decreased to nine.

In the past two decades there have been a number of significant changes in the medical curriculum. The long-standing compartmentation between basic science and clinical programs has lessened, and there is a major emphasis on integrating and correlating both horizontally and vertically. Medical students begin the study of patients in the first year of medical school. Significant segments of the curriculum are allocated to electives which on the average represent more than one year of the four-year curriculum. As premedical education now includes knowledge taught in the basic science departments, and clinical teaching today is more oriented toward applied basic science, time allocated for the basic department sciences has been reduced. Instruction in some of the medical and surgical specialties has been curtailed or even terminated. There is a greater emphasis on teaching in the out-patient department and less on bedside teaching. Educational affiliations have been established with

nonuniversity hospitals in order to diversify a student's clinical experience with patients. The pendulum in U.S. medical schools is swinging away from biomedical research to medical care. The emphasis is on training in primary care, which includes internal medicine, pediatrics, and family medicine.

Admissions Process

Medical faculties devote a significant amount of their time to the admission process; they may spend as much as 1,000 man-hours on selection. There are one or more associate or assistant deans whose principal responsibility is the selection of students. There is an Admissions Committee, composed of faculty and students, which evaluates all qualified applicants and students. As a result of the rigorous admissions process, the total attrition rate in 1975-76 was 1.53% with the largest loss, 2.31%, in the first year. Lack of interest in medicine and psychological problems account for about 60% of dropouts, and about 40% are due to poor academic performance.

CRITERIA FOR ADMISSION

Factors considered in the selection of medical students are:

1. Grade-point Average

The academic record continues to be the most important criterion with special weight given to achievement in biology, chemistry, and physics. The "grade inflation" in the colleges, and the fact that many institutions do not report unsatisfactory grades, pose the problem of very large numbers of students with excellent records with little differential in their grade-point averages.

2. The Medical College Admissions Test

The Medical College Admissions Test (MCAT) is a national examination which is taken by essentially all applicants. It includes sections on science, quantitative and verbal ability, and general information. It is a multiple-choice, short-answer examination, administered by the Association of American Medical Colleges.

In recent years the value of the MCAT has come under question, and many schools virtually ignore the verbal and general information tests. Some schools use the scientific component to evaluate students from schools with whose academic caliber they are not familiar. Another criticism is that the MCAT discriminates against students who have not had extended experience with short-answer, multiple-choice examinations. This applies primarily to students from lower income groups and is especially important as the medical schools endeavor to enroll student bodies that are more broadly representative of the population rather than mainly upper and upper-middle class income groups. A third criticism of the MCAT is that it only predicts performance in the basic sciences and has no relevance to clinical ability.

The 30-year-old MCAT has been revised and a new admission examination will go into effect in the Fall of 1978. The new test, administered in the Spring of 1977, has been broadened to include analytical and problem solving skills that doctors need in office practice. Scores will be based on a combination of short answer and problem-solving questions. The General Information section of the current test, which was designed to determine a student's broader knowledge of modern society, has been deleted. The new examination tests skills in basic science information, problem solving, mathematics, and reading. Test scores are broken down so that applicants and medical schools are advised of areas where improvement is needed. Thus, an applicant is given separate scores in biology, chemistry, and physics.

3. Premedical Advisory Reports

Most medical schools have developed liaisons with the premedical advisors of the colleges from which they draw the largest number of their students. By establishing such working relations, a premedical advisory committee at the college is given a significant role in the selection process and their evaluation of candidates becomes an important factor.

4. Interview

For many schools the interview is an essential part of admissions process. It affords the school an opportunity to assess

motivation and the degree of the candidate's interest in the school, and to detect physical or personality defects. For the candidates it offers additional information about the school. For candidates whose domiciles are far distant from the school, alumni may be asked to carry out the interview. Interviewers are usually asked to follow a structured outline so that uniform information can be gathered for comparisons of candidates. Medical schools place little if any credence in unsolicited letters of recommendation.

American Medical College Application Service

Major efforts are under way to reduce the burden on admissions committees as the average number of applications per candidate now approaches nine. The American Medical College Application Service (AMCAS) is a nonprofit, centralized application processing service; in 1976-77, 86 of the 112 medical schools participated in it. The applicant submits a single set of application materials, including scores on the MCAT, and transcripts of his academic achievement. The AMCAS collates the information, verifies and evaluates the student's academic records, coordinates and reproduces the data, and transmits them to each AMCAS school for which the applicant seeks admission. The admissions committees are saved much of the time and expense of the application process. The undergraduate college is asked only to provide a single transcript rather than a transcript for each school to which the applicant seeks admission.

Early Decision Plan

Another and probably much better way to reduce the number of applications processed by admissions committees is the Early Decision Plan whereby a student may receive an early decision on an application to the school of first choice. The decision is reached by October 1 so that if rejected the applicant has ample time to apply to other schools. If he or she is accepted, the other schools to which he or she would have applied are saved the extended time entailed in processing the application. Further, by such early selection, admissions committees in the other schools can devote their time to candidates who would be more likely to attend their school if afforded the opportunity.

The highly qualified applicant selected by the school of his first choice is spared the time, energy and money entailed in applying to a number of schools and can devote the final year in college to academic and extracurricular activities.

Noncognitive (Human and Personal) Factors in Access

A major complaint from the American people is that our doctors have lost the "personal touch." Patients claim that doctors do not wish to listen to their problems nor explain the reasons for the management of their illnesses. The sophisticated technological base of U.S. medical practice with heavy reliance on laboratory procedures has contributed to the loss of the traditional personalized doctor-patient relationship. Admissions committees, increasingly concerned about this problem, are making positive efforts to develop procedures which would consider factors other than achievement in science.

The factors to be identified include compassion, integrity, dependability, decision making, emotional stability, leadership, interprofessional and interpersonal relations, and coping capabilities. The Educational Testing Service, the Consortium of Thirteen Medical Schools, and the National Board of Medical Examiners are developing a series of simulated interview tests to measure these human qualities. These tests include patient and employer-employee interviews and sessions with guidance counselors. The results will be measured against more conventional tests including personal interviews, personality tests, and biographical questionnaires. The study is linked with an effort to develop selection and outcome measures of a doctor's performance in diagnostic problem solving.

Final Comments

At the end of 1974 an estimated 357,000 physicians were in active practice in the United States. This is equivalent to 164 physicians per 100,000 population, the most favorable in this century. During the past ten years the number of highly qualified applicants for medicine has risen sharply, and there has been a rather comparable increase in the number of openings for the

study of medicine. The American public and its elected representatives have been pressing for more doctors through new medical schools and the expansion of existing schools.

However, there is evidence that we are moving into an era in which pressure will be for a redistribution of physicians, both geographically and by type of practice rather than the familiar cry: "More doctors!" In 1975-76 there was a modest decrease in the number of applicants—the first decrease in a decade. Intense competition for entry into medical school and the concerns about federal control of the practice of medicine are turning our youth toward other career opportunities.

Whether or not it will be possible to develop procedures by which human and personal characteristics can be identified in medical school applicants is debatable. It is clear that a major re-evaluation of the selection process is underway.

I have commented on several occasions that the U.S. system of medical education may not be a good "export" system. It is quite long, it is expensive with large full-time faculties, and it has a strong scientific-technological base. The amount of time and effort that our faculties spend in the selection of students may seem staggering, but I do not think that we will change from the meticulous scrutiny of qualified applicants. Instead, we are endeavoring to refine and expand the factors that determine access to medical education.

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APPENDIX

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